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HEALTH RESORTS OF THE BRITISH ISLANDS

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DR. NEVILLE WOOD and the "advisory committee" are to be congratulated on this work, which certainly satisfies a great want. The majority of the descriptions of the English health resorts have been written by local men, and though they have been rigidly edited, they still possess some native bias; but, on the whole, the book can thoroughly and conscientiously be recommended. There is one general plan of arrangement for the whole of the articles, and we wish that all books coming before us were so easy of understanding. The plan adopted in the Special Health Resorts Number of *THE PRACTITIONER* (July, 1908), of a comprehensive cross-index of "Health Resorts" and "Maladies," is utilized in this work and forms a very useful feature.

HEALTH RESORTS OF
THE BRITISH ISLANDS



HEALTH RESORTS

OF THE

BRITISH ISLANDS

EDITED BY
NEVILLE WOOD, M.D.

MEMBER OF THE COUNCIL OF THE SECTION OF BALNEOLOGY AND CLIMATOLOGY
OF THE ROYAL SOCIETY OF MEDICINE

*WITH THE ASSISTANCE OF AN ADVISORY COMMITTEE
APPOINTED BY THE COUNCIL OF THE SECTION*

WITH 40 ILLUSTRATIONS AND 3 MAPS

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PREFACE

IN that admirable work *Climates and Baths of Great Britain*, published just ten years ago by the Royal Medical and Chirurgical Society, while Scotland (save for descriptions of two of her spas) is not referred to, the survey of England, Wales and Ireland is practically complete, and includes, in addition to health resorts, places mainly residential in character.

Both in purpose and plan there are several points of difference in the present volume. It has had its origin in the belief that there was room for a work on the model of those manuals published on the Continent, in which health resorts as such, and matters of interest in relation to them, are the subjects exclusively dealt with. It was thought not only that such a publication might prove of service to the medical profession at home, but that it was time for some effort to secure international recognition for British health resorts. To aid in bringing their advantages to the notice of foreign physicians has, in fact, been a main object of these pages, arrangements for a French edition of which are in progress.

As best serving the ends in view, attention has been focussed on the principal resorts, those of minor importance being either briefly dealt with or entirely omitted.

Considerable difficulty was experienced in the collection of information concerning sea bathing and mineral water charities, and the list of the institutions may not be quite complete. Nevertheless, it is hoped that the section devoted to them will be found useful by practitioners who appreciate the value of those forms of treatment for the poorer of their patients.

Since before long the State will provide sanatorium benefit for the working classes, the list given here is restricted to institutions intended for persons able to meet the cost of their treatment, in whole or in part.

In addition to a general discussion in two of the chapters, there are sections comparing the indications for British and for Continental spas and climatic stations. Chiefly for the convenience of physicians abroad, mention has been made by name of hydropathic establishments, and in most of the chief resorts, of hotels.

The names of the sanatoria are from published sources, while the hydropathic establishments and hotels have been selected from personal recommendations. Writers of the descriptive notices are in no way responsible for the choice.

A place can scarcely be regarded as a health resort unless its sanitation is satisfactory in all essential details, and no town in Great Britain has been described in these pages unless there was reason to believe that this condition had been complied with. Thus, space has been economized by the omission of many references to the subject which would otherwise have been necessary. From inquiries made in Ireland it would appear that while, perhaps, not quite up to the English standard, sanitation is satisfactory in the residential quarters of the principal resorts.

In conclusion, I desire to thank the Council of the Section of Balneology and Climatology for their encouragement, and for permission to quote the words of their resolution in connection with the present publication, that it has been "prepared with the assistance of an advisory committee appointed by the Council of the Section of Balneology and Climatology of the Royal Society of Medicine." To the advisory committee I am indebted for suggestions concerning the general plan of the work, and for help in the decision of some points of difficulty.

I would most cordially thank Dr. William Gordon (Exeter), Dr. C. W. Buckley (Buxton), and Drs. Fortescue Fox and Clippingdale (London) for the readiness with which they have rendered assistance throughout.

I am under obligation also to various associations, municipalities and private individuals for lending blocks and photographs, as well as for other aid.

Acknowledgment is due to Mr. Arthur Gundry, and to Mr. Paul Lafleur of McGill University, Montreal, for their care in reading the proofs, and for valuable counsel in literary revision.

Finally, the chief expression of gratitude is owed to Dr. Gustave Monod of Vichy, and Dr. A. Reboul of Châtel-Guyon, who have generously undertaken to translate and arrange a French edition.

NEVILLE WOOD.

London, August 1912.

CONTENTS

| | PAGE |
|--|------|
| THE NATURAL MINERAL WATERS OF THE BRITISH ISLANDS, AND THEIR USES | 1 |
| DESCRIPTIONS (IN ALPHABETICAL ORDER) OF THE CHIEF SPAS AND INLAND CLIMATIC STATIONS; THEIR RESOURCES AND THE MALADIES FOR WHICH THEY ARE SUITABLE. . . . | 11 |
| HYDROPATHIC ESTABLISHMENTS AND INSTITUTIONAL TREATMENT | 121 |
| THE PRACTICE OF HYDROTHERAPY: MINERAL WATER AND SEA BATHING CHARITIES | 125 |
| THE EAST COAST OF ENGLAND, FROM BERWICK-ON-TWEED TO THE THAMES | 135 |
| ISLE OF THANET | 147 |
| THE COAST OF KENT, FROM SANDWICH TO FOLKESTONE . . | 152 |
| THE SOUTH-EAST AND SOUTH COAST OF ENGLAND, FROM SAND- GATE TO SOUTHSEA | 159 |
| VENTNOR (ISLE OF WIGHT) | 172 |
| BOURNEMOUTH | 178 |
| THE COASTS OF SOMERSET, DORSET, DEVON AND CORNWALL, WITH THE TABLE-LANDS OF DARTMOOR AND EXMOOR . . | 181 |
| THE COAST OF WALES | 203 |
| THE NORTH-WEST COAST OF ENGLAND, FROM WALES TO SCOTLAND | 209 |

| | PAGE |
|---|------|
| THE COAST CLIMATES OF SCOTLAND | 215 |
| THE SEASIDE HEALTH RESORTS OF IRELAND | 224 |
| SANATORIUMS AND SANATORIUM TREATMENT IN GREAT BRITAIN | 229 |
| INTERNATIONAL ASPECTS OF BRITISH HEALTH RESORTS | 234 |
| COMPARISON OF CENTIGRADE THERMOMETER WITH FAHREN- HEIT'S AND RÉAUMUR'S | 244 |
| OUTLINE MAPS SHOWING THE POSITION OF THE CHIEF HEALTH RESORTS :— | |
| ENGLAND WITH WALES. | 245 |
| SCOTLAND | 246 |
| IRELAND | 247 |
| INDEX OF HEALTH RESORTS MENTIONED IN THE TEXT | 249 |
| INDEX OF MALADIES REFERRED TO BY NAME. | 252 |

LIST OF ILLUSTRATIONS

| | <i>Facing page</i> |
|---|--------------------|
| BATH, THE GARDENS AND RIVER AVON | 11 |
| BATH, THE GREAT ROMAN BATH | 18 |
| BRIDGE OF ALLAN | 26 |
| BUXTON, GENERAL VIEW | 31 |
| GOYTE VALLEY, BUXTON | 38 |
| CHURCH STRETTON | 44 |
| CROWBOROUGH | 48 |
| DROITWICH, THE BRINE BATHS | 50 |
| DROITWICH, BRINE SWIMMING BATH | 52 |
| HARROGATE, SECTION OF STRATA | 54 |
| HARROGATE, THE ROYAL BATHS | 61 |
| HARROGATE, PART OF THE VALLEY GARDENS | 66 |
| HINDHEAD, PORTSMOUTH ROAD | 69 |
| LEAMINGTON, THE PARADE | 72 |
| THE PUMP ROOM AND BATHS, LEAMINGTON | 74 |
| LLANDRINDOD WELLS, GENERAL VIEW | 78 |
| ALPINE BRIDGE, LLANDRINDOD WELLS | 82 |
| LLANGAMMARCH WELLS | 85 |
| LLANWRTYD WELLS, A RIVER VIEW | 89 |
| MALVERN FROM THE HILLS | 94 |
| MALVERN, THE QUEEN'S DRIVE | 97 |
| MATLOCK, HIGH TOR | 98 |
| MATLOCK BATH | 101 |

| | <i>Facing page</i> |
|---|--------------------|
| TREFRIW VILLAGE | 111 |
| WOODHALL SPA, THE SPA BATHS AND PUMP ROOM . . . | 115 |
| WOODHALL SPA, CHURCH WALK | 121 |
| HUNSTANTON, THE CLIFF | 142 |
| CROMER | 144 |
| BROADSTAIRS | 150 |
| FOLKESTONE | 156 |
| HASTINGS, THE OLD TOWN | 162 |
| CHILDREN'S PLAYGROUND, BEXHILL | 166 |
| VENTNOR | 172 |
| VENTNOR FROM THE SEA | 177 |
| THE CASTLE ROCK, LYNTON | 181 |
| ON THE WEST DART | 184 |
| WESTON-SUPER-MARE | 188 |
| NEWQUAY, FISTRAL BAY | 191 |
| TORQUAY | 192 |
| SIDMOUTH FROM PEAK HILL | 196 |

Health Resort

ERRATA.

P. 15, line 5. *For* "ho" *read* "hot."

P. 123, line 3 from bottom. *After* "institution" *read* "at Peebles."

P. 124, line 4. *For* "Streatham" *read* "Strathearn."

P. 180, last line. *For* "Doré" *read* "Dore."

P. 190, lines 1 and 2. "Bath Hotel and Boarding Establishment" *should be*
"at Lynmouth."

| | <i>Facing page</i> |
|---|--------------------|
| TREFRIW VILLAGE | 111 |
| WOODHALL SPA, THE SPA BATHS AND PUMP ROOM . . . | 115 |
| WOODHALL SPA, CHURCH WALK | 121 |

HEALTH RESORTS OF THE BRITISH ISLANDS

THE NATURAL MINERAL WATERS OF THE BRITISH ISLANDS, AND THEIR USES.

I. THE INFLUENCE OF CLIMATE.

IN the experience of spa physicians the law of inter-action between climate and waters is often exemplified. To this law British spas offer no exception. The geographical situation of the British Isles, lying to the north and west of the continent of Europe, and the characteristics of an island climate, must powerfully modify the effect of British waters. Climatic conditions are, indeed, often the dominant influence in hydrological treatment. Whenever a patient is submitted to the action of waters and baths the effect of the local climate must be reckoned with. Not only the ordinary climatic elements, temperature, humidity, sunshine, etc., but the soil and the configuration of the health station, its latitude and especially its height above sea-level, are all physical factors that may modify, sometimes to a surprising extent, the reaction of the invalid to spa treatment and, therefore, its results. The modifying influence of climate, in the large sense of that word, is especially noticeable in the case of baths. We know that thermal bath treatment can often be tolerated by delicate persons in a comparatively cool and dry air, because the increased bodily heat is more freely thrown off. On the other hand, in a hot and humid climate the loss of bodily heat is checked, and hot treatments are less well borne there by many persons. It is for this reason that in warm climates such baths are apt in some cases to cause a condition of weakness which has been described as "thermal debility."

In order that baths should produce an *optimum* effect, certain

definite external physical conditions are necessary for each case. Different countries and localities provide these conditions in great variety, and it is in the selection of climate as well as of waters that the wisdom of the physician is shown.

The British health resorts differ widely from those of the European continent in regard to these external conditions. We have to remember that they are situated nearer by as much as five to ten degrees of latitude to the polar circle than the great spas of Germany and France. We are here naturally concerned with the summer climate, since that is usually the season for spa treatment. A glance at the isothermal lines upon the map of Europe will show to what extent the various health resorts differ in respect to summer temperatures. While the British spas lie between the isotherms of 14° and 17° C. (nearly 57° to 62° F.) those of Normandy, Belgium and North Germany are between 18° and 19° C., the Vosges spas and those of the Black Forest between 19° and 20° C., while the spas of the Rhine and those of Bavaria are on the isotherm of 20° C. Farther south, the spas of the Auvergne district and Evian, with those of Switzerland and Austria, are about one degree warmer; while the Pyrenean spas, Aix-les-Bains, and the principal Italian stations are found between the lines of 22° and 25° C. In these figures no allowance has been made for altitude.

Geographical position is but one among many factors that make the British summers relatively cool and fresh, with frequent changes of temperature. The comparatively low range stimulates heat production and metabolism, while the frequent variations of the thermometer tend to educate the reactive powers of the skin. Some of the British spas, such as Buxton, Harrogate, Llandrindod, and Llangammarch, enjoy a climate commonly associated with the eastern and northern parts both of England and of Scotland—that is to say, of the kind usually described as “stimulant,” “tonic” or “bracing.” They have but little shelter, there is a free movement of air and the summers are relatively cool. These spas are all situated high in moorland or mountainous country.

On the other hand, Bath, Leamington and Cheltenham in the west of England, and Lisdoonvarna and the other Irish spas, share the sedative qualities of the climate of the regions

in which they are situated. The summer climate approximates to the Continental type, and has been described from its effects upon many individuals as "enervating" or "relaxing." There is no doubt that such is the effect produced upon persons, whether invalids or not, who require the invigoration of strong or tonic air. In the same manner the many health-seekers for whom a soft or sedative air is required find a keen or bracing air too "exciting," and often injurious. The two types of climate are in truth matched by two corresponding types of chronic disorder, and no doubt also by types of physical temperament or constitution. For example, one patient says, "I like hot and stuffy places," or "I am fully alive only in warmth"; another, "I am never well but in bracing air," or "I am always better in the winter season."

In addition to the above more typical stations there is an intermediate class of localities in Great Britain which are partly stimulant and partly sedative. At these places the climatic influence differs with the individual reaction and often according to the season. Frequently the total effect is partly stimulant and partly sedative, a complex which may prove valuable in states of nervous exhaustion and irritation in middle and later life. Among such spas in Britain are Strathpeffer, Bridge of Allan, Woodhall Spa and Matlock Bath. Lastly, it should be added that the expressions *sedative* and *stimulant*, as here used, are comparative terms; for there are no British spas wholly stimulant or wholly sedative, but most of them may be regarded as having a preponderance of one character or the other.

II. GROUPING OF THE BRITISH WATERS.

1. *Thermal and Sub-thermal Waters* (naturally hot or warm springs).

Waters of this class abound in the volcanic and mountainous districts of France, in parts of Germany, Italy, Algiers, and other countries. In England there are several springs of this kind. Of these the chief are Bath (104–120° F.) and Buxton (82° F.), both of which were used during the Roman occupation. The others are Matlock Bath (68° F.) and Bakewell (60° F.) in Derbyshire, and Clifton (73° F.) in Somerset. Ireland possesses

one such water at Mallow, Co. Cork, formerly much resorted to. Simple thermal waters have but little mineralization, but contain a considerable quantity of nitrogen and other gases, and are often highly radio-active. They are principally employed externally in various forms of thermal treatment, but are also taken internally for their alterative action and for their activity as solvents.

Bath, not only by the temperature of its waters but also by its mild and equable climate, is well adapted for thermal treatment.

In winter time, as well as in autumn and spring, Bath is an admirable resort for weak and debilitated persons, especially in the middle and later periods of life. Many painful chronic rheumatic and gouty ailments are relieved by the baths, and the processes of vascular and nervous degeneration are arrested or mitigated. Sub-inflammatory and congestive gouty states of the connective tissues, and the resulting irritable weakness of the nerve centres and circulation, often subside under the sedative influence of these baths. The considerable proportion of sulphate of lime in these waters (1.3 per mille) must not be overlooked, for this ingredient makes them not only diuretic but tonic to the gastric mucous membrane.

In contrast with the thermal and sedative treatment at Bath, Buxton offers a more stimulating and sub-thermal treatment. The town has an open situation at an elevation of 1,000 feet, and the climate is bracing. The natural temperature of the waters (82° F.) is well adapted for sub-thermal baths. Comparatively prolonged and flowing baths are sometimes used, and are helpful in chronic vascular disorders (*e. g.* high blood pressure), and in the debility attending and following long-continued illness. A reaction, marked by an increase of articular and other pains, and by general and constitutional disturbance (vertigo) is sometimes observed at Buxton. Chronic rheumatic and gouty ailments and some forms of neurasthenia, for which a warmer treatment is inadvisable, often do well at Buxton, and the climate is well adapted for hydrotherapy.

Matlock Bath, with a sub-thermal water at 70° F., enjoys a climate well suited for hydrological treatment. Like others of the same class, the waters are very feebly mineralized (0.47

per mille, chiefly lime salts), but are interesting as containing a colloid substance, which gives them a pleasant and unctuous quality in the bath, and one well adapted for the douche-massage.

2. *Sulphur Waters, and Salt Sulphur Waters.*

In volcanic districts, as in the Pyrenees and in New Zealand, *hot* sulphide-containing waters are often met with. *Cold* sulphur springs usually contain a much larger charge of sulphur, and often in the form of sulphuretted hydrogen. All the British sulphur waters are cold. The element is present as a sulphide, either the gas just mentioned or the alkaline sulphide of sodium, and occasionally as sulphide of calcium. It would seem that the base is of no therapeutic importance, and that the element, however administered, depends for its effects on the organic combinations to which the hydric sulphide gives rise in the tissues when in a state of heightened chemical activity.

A remarkably uniform tradition has given to natural sulphur waters a reputation in chronic scrofulous and skin disorders, in affections of the liver and in certain kinds of dyspepsia. Many cases of gout and of gouty plethora, and of chronic and sub-acute rheumatism undoubtedly benefit from their use. A course of sulphur waters and baths has long been regarded as assisting the specific action of mercury in syphilis. Pure sulphuretted waters are generally slightly constipating, and are apt to cause a tendency to anæmia in predisposed subjects, which used to be described as a "blood-moulting" process due to a combination of sulphur with hæmoglobin. It is probable that some undetermined change does take place in the blood. When taken into the stomach the volatile hydric sulphide is rapidly diffused in the tissues, and is finally eliminated by the skin as well as by the kidneys and bronchial mucous membranes.

At Harrogate, the chief English sulphur spa, this element is combined with salt. The "Old Sulphur Well" contains as much as 0·7 per mille sodium sulphide, with 37 volumes of sulphuretted hydrogen. Harrogate is fortunate in the possession of an extensive group of sulphur springs, in which the proportion of salt varies from 3 to 13 parts per mille.

Some of these springs are, therefore, hypertonic with reference to blood serum, and they are consequently purgative in their action (*see* Salt Springs). Certain other of these springs, with but little salt, contain carbonates of calcium and magnesium, and exert, if anything, an astringent action on the intestinal mucous membrane. Associated with the sulphur waters are also chalybeate sources. It will be seen that there is, therefore, at Harrogate, a considerable range of therapeutic action, which will be found fully dealt with in the article on this spa. It follows from what has been already stated, that the influence of the dry and bracing climate of Harrogate is an important feature, as modifying the result of hydrological treatment.

Llandrindod (in mid-Wales), also, has muriated waters, some of which contain sulphuretted hydrogen (1 to 14 vols. per mille). The proportion of chloride of sodium (1.1 to 4.7 per mille) places these waters among the *hypotonic* group, with reference to the fluids of the body. They present, in fact, a natural saline solution in a convenient and assimilable form. Their action and uses are those of a mild muriated spring (*see* Salt Waters). They are gently aperient, and more strongly diuretic. The clinical application embraces the large class of disorders of defective elimination and nutrition, catarrhal dyspepsia, constipation and jaundice. Cases of general debility and neurasthenia, with which dyspepsia is so often associated, often do well at Llandrindod. In these cases the hydrological treatment is powerfully seconded by the invigorating climate.

Moffat, also, must be placed among the salt sulphur waters, being mineralized by sodium chloride (0.9 per mille) with 3 volumes of sulphuretted hydrogen. The place is pleasantly situated, and enjoys an agreeable and sheltered climate, suitable both for summer and winter visitors.

Standing in rather marked contrast with the salt sulphur waters above described, are the so-called "pure sulphur waters" of the British Isles. These are distinguished by a relatively large proportion of sulphuretted hydrogen gas, and by the absence of sodium chloride and other salines. At spas of this kind one may, therefore, expect to find the typical therapeutic effect of the sulphide.

Strathpeffer Spa is the type of this group. The two strongest

wells contain as much as 40 and 69 volumes per mille of sulphuretted hydrogen, but only from 1 to 1·6 of total solids. The Morison well is rich in lime salts, a fact which gives it a special action. The Cromartie spring is the strongest sulphuretted water in Britain. Waters of this class should always be taken absolutely fresh from the well. They are powerfully diuretic, but slightly constipating. They are indicated in gout, especially in weakly and debilitated subjects, even in the presence of kidney affection, and are also valuable in chronic rheumatism, in atonic and catarrhal dyspepsia and in gouty eczema.

Llanwrtyd (700 to 800 feet) has a strong sulphuretted water (36 vols. per mille), well adapted by its abundant yield for immersion baths. It is used with success both internally and externally for chronic skin affections—eczema, psoriasis, seborrhœa, etc.; also for gout and gastric dyspepsia. Like Strathpeffer, Llanwrtyd has an old reputation for scrofulous affections. As at most other sulphur spas, there are useful accessory chalybeate waters, containing protocarbonate of iron.

Lisdoonvarna (in Ireland) offers weak sulphuretted waters, having 5 or 6 volumes of sulphuretted hydrogen per mille and little or no solid ingredient. The indications are the same as for other sulphur waters, with a preference for gouty and digestive disorders. The resources of the place have, however, been hitherto but little developed.

The same remark may be made about Lucan, another sulphur spa, situated eight miles from Dublin.

3. *Salt (Muriated) Waters.*

Strong salt waters or brines abound in England, and are, in many places, employed for baths.

Droitwich has a saturated brine containing 307 parts per mille of salt, or ten times as much as sea water. The particular effect of marine and salt baths is ascribed to the stimulation of the nervous end-organs by crystalline particles in and upon the skin. The Droitwich brine baths offer a typical *surface treatment*. They act both as a stimulant and revulsive in painful chronic myositis and fibrositis (lumbago and sciatica), and generally in rheumatic and gouty articular affections.

The treatment is also valued as a tonic in convalescence. Post-arthritic and traumatic stiffness and contraction are assisted by the Droitwich baths, with which active and passive movements can often be combined, with considerable mechanical advantage owing to the density of the water.

Nantwich and Northwich, in the salt districts of Cheshire, have also strong brine baths, and similar baths are given at Saltburn-by-the-Sea, Malvern, Stafford and other places.

Coming now to potable salt waters, although the British Islands can boast of none which are *hot* or effervescing, they are well supplied with *cold* salt waters. Some of these contain, besides chloride of sodium, salts of calcium or barium, and offer a considerable variety in their composition, action and uses.

Strong hypertonic salt waters, from 30 to 50 per mille, are irritating to the intestinal mucosa, but may be employed in moderate doses where the kidneys are sound, in hydræmia and abdominal plethora. Waters of a lower degree of tonicity, from 5 to 20 per mille, when taken into the stomach tend to dissolve mucous deposits and bring about a dilatation of the blood vessels. Absorption, and consequently general nutrition, are thus stimulated. It should be remarked that these actions belong also to certain British sulphur waters (*e.g.* Harrogate and Llandrindod), which contain considerable quantities of chloride of sodium.

The waters of Woodhall Spa are hypertonic, with 20 per mille chloride of sodium, and a certain amount of chloride of calcium and magnesium. They are chiefly indicated in atonic conditions of the stomach and bowels, with or without catarrh, and in scrofulous affections. Employed externally, they are useful in chronic and sub-acute rheumatism, and baths of this character are believed (as at Kreuznach) to reduce the size of uterine fibromata and so to relieve pressure and hæmorrhage. Experience supports the opinion that this, as well as other forms of thermal treatment, is capable of reducing morbid effusions and deposits. When vaporized or pulverized, the water is also employed locally for chronic rhinitis and pharyngitis.

Besides Woodhall Spa, the following are salt waters with which lime salts are effectively combined :—

Bridge of Allan.—This is a nearly isotonic water, containing a large quantity of chloride of calcium (3·8 per mille), with some sulphates and carbonates. Hitherto it has been chiefly employed in dyspepsia, venous engorgement and catarrhs.

Leamington.—In addition to alkaline sulphates these waters contain a considerable amount of the calcium sulphate (gypsum), which no doubt gives them their diuretic quality and renders them tonic to the gastric mucous membranes. They are gently aperient, and are employed *inter alia* for dyspepsia and disordered liver, particularly in persons from hot climates.

At **Ashby-de-la-Zouch** there is a hypertonic salt water, also enriched with sulphate of calcium (2·5 parts per mille).

Llangammarch (in mid-Wales) may be classed among the salt spas, although its mild, muriated and calcareous water is distinguished also by the presence of barium. The essential ingredients are the combined chlorides of sodium, calcium and barium, presented in an assimilable form. They should be helpful where these chlorides and the calcium salts are indicated. The water is employed in sub-thermal baths for cardio-vascular cases. The barium salt is regarded as a cardiac tonic. Llangammarch is a restful spa, with a bracing climate. It is well adapted for the treatment of many circulatory disorders.

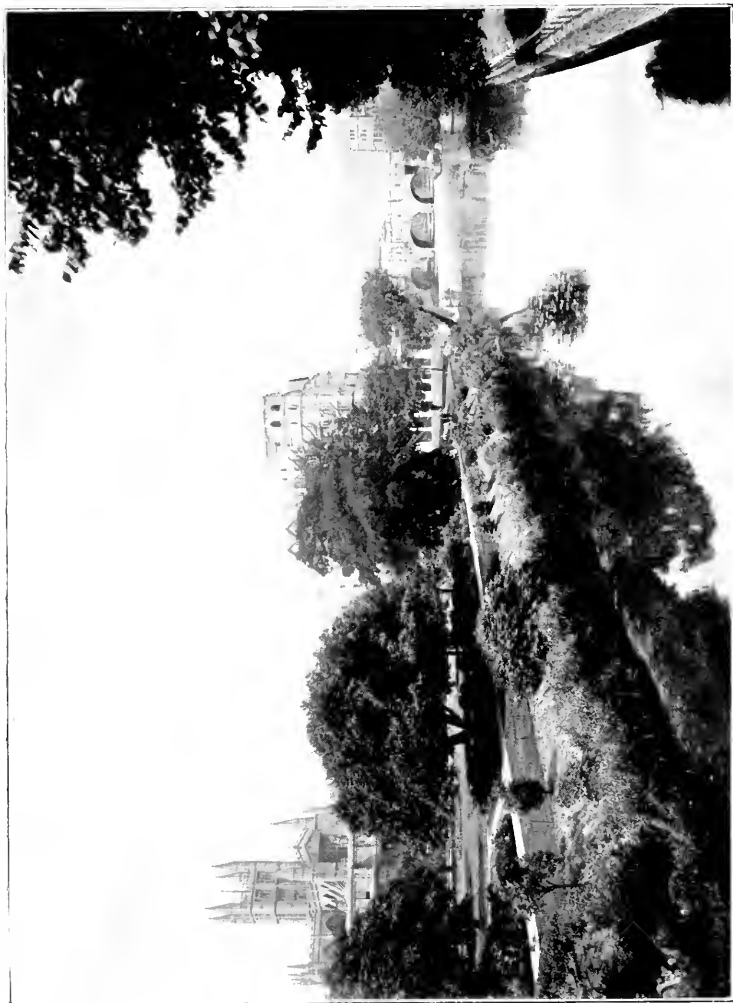
Lastly, **Cheltenham**, formerly much frequented, is not the least interesting member of this class. The waters contain a moderate amount of salt, combined with sodium and magnesium sulphate. One of the springs also contains sodium bicarbonate, and is believed to be the only “alkaline water” in the British Isles.

4. *Iron Waters.*

The sulphur spas, Harrogate, Strathpeffer, Llandrindod and others, have also chalybeate sources containing the carbonate of iron. Among many British waters of this class the following may be mentioned:—

Tunbridge Wells (in Kent) at one time shared the laurels of fashion with Bath. The waters contain 0·06 per mille of the carbonate of iron, but without free carbonic acid gas.

Flitwick (in Bedfordshire) has a remarkable spring containing



BATH, THE GARDENS AND RIVER AVON.

DESCRIPTIONS (IN ALPHABETICAL ORDER) OF THE CHIEF SPAS AND INLAND CLIMATIC STATIONS; THEIR RESOURCES AND THE MALADIES FOR WHICH THEY ARE SUITABLE.

BATH.

Mineral Waters : Indeterminate, hot, and radio-active.

General Characteristics and History.—Bath is pleasantly situated on the river Avon, about twelve miles from Bristol. The city covers a broad, open valley, and the slopes of the hills on either side. Most of the residential portion has a south aspect, and is sheltered to the north and east by the hill on the side of which it is built. Historically and architecturally it has many points of interest. Its importance during the Roman occupation of Britain is indicated by the extensive and well-preserved remains of Roman baths. After a long period of comparative inactivity, Bath regained eminence as a fashionable bathing resort in the eighteenth century, when the greater part of the city as it now exists was built. The satisfactory completion of the bold and artistic architectural scheme on which the city was then designed has given to Bath an exceptionally picturesque and harmonious aspect; its crescents, squares, parks and gardens combining to make it one of the most beautiful cities of Great Britain.

The advantages of Bath as a health resort are greatly enhanced by its many open spaces, among which the Victoria Park, with its well-kept botanical gardens, may be specially mentioned. The surrounding country, too, is remarkably beautiful; particularly the hilly districts of Wiltshire and Somerset, with their old-world villages and fine country houses; while, somewhat farther afield, there are many places of scenic, historic or architectural interest.

Climate.—In general terms, the climate of Bath is mild and equable. The sheltered position of the town largely protects

it from cold northerly and north-easterly winds; while its south aspect ensures the enjoyment of all the sunshine available. Soft, warm south and south-west winds prevail, snow seldom falls, and frost, when it occurs, is rarely severe or long continued. The average rainfall is relatively low. While the above remarks apply to the lower and more sheltered parts of the city, it must be clearly understood that the higher and more exposed portions are decidedly more bracing. Thus there is a wide range of variety in the climate, from the warm, sedative air of the centre of the city to the cool, breezy and invigorating atmosphere of Lansdown (750 feet) on the one side, and Combe Down (650 feet) on the other.

Season.—Visitors to Bath may be divided into two distinct classes: those seeking its climatic advantages, and those whose primary object is a course of treatment for special disorders by baths and waters.

Apart from its advantages as a spa, Bath is specially suitable for a great variety of cases in which it is desirable to avoid the worst features of an English winter, and for these the season extends from early autumn to late spring. Though the bathing establishment is open throughout the year, it is during the spring and autumn months that the great majority of patients visit Bath for balneological treatment. The climate is then sufficiently mild to obviate any risk of chill during a course of warm baths, yet not too hot for feebler patients peculiarly susceptible to heat. The spring season extends from February to June, and the autumn from September to November, inclusive.

As a resort for invalids in the summer, Bath has been somewhat overshadowed by the many other British and foreign spas then open. Nevertheless, certain of the more robust types of patient derive more benefit from a course of treatment in the hotter months than at any other time of year. This applies especially to many cases of chronic gout and osteoarthritis of the plethoric type, in whom it is particularly desirable to stimulate the excretory functions of the skin, and lower arterial tension. The summer climate of Bath, intermediate between that of the more exposed health resorts in this country and the far hotter Continental watering places, is suited to a large class of patients who require warmth, but

are not strong enough to sustain either the fatigues of Continental travel or the enervating heat of foreign spas.

Many patients, again, who are precluded, by the severity of arthritic lesions, from taking exercise, find Bath more congenial in summer than the colder British health resorts.

Bath contrasted with other British and Foreign Bathing Resorts.—Bath differs in some important respects from the majority of British, as well as foreign, bathing resorts. Its softer and warmer climate render it peculiarly suitable for a wide variety of patients, for whom the searching cold of the more bracing of our spas is hardly desirable, particularly for middle-aged or elderly people with arterial, renal or arthritic degenerations. It contrasts, again, with all the more important of the British, and with most European spas, in being in full season even during the coldest months of the year and in the spring and autumn, when, at the majority of the others, a course of treatment is barely feasible.

In this country, Bath stands alone in the possession of an unlimited supply of *hot* radio-active mineral water.

Bath as a Resort for Foreign Invalids.—The benefits claimed for a change of surroundings as an accessory to spa treatment are no less likely to be derived by a foreign patient from a visit to a resort in this country, than by an Englishman from going to one abroad. The factor of a novel environment is the same in either case. Recognition of it may in part explain the great influx of late to Bath of patients from America and from our own dominions overseas. But, besides her natural mineral waters, and an equipment for their exhibition to the greatest practical advantage, Bath has certain features which entitle her to rank high among the British spas suitable for foreign visitors. As regards patients from the Continent, there is no spa in Europe which at any time of the year has an exactly similar climate. Its advantages for thermal treatment in winter and in the spring and autumn have already been pointed out. During the summer, its mild climate would seem to render Bath typically adapted for those foreigners who find their own resorts oppressively hot, yet fear a change so abrupt as a visit to some of the cooler localities of our islands would involve.

Dietary.—When necessary, the diet of patients undergoing

treatment at Bath is carefully regulated. Special arrangements are made at the principal hotels and boarding-houses to ensure the provision of a suitable menu, in accordance with a general scheme drawn up by a medical committee.

Cases for which Bath is specially indicated in virtue of its Climatic Features.—During the cold months of the year, Bath is specially suitable for the following types of patients: (1) Elderly people with arterial degeneration, (2) cases of chronic gout with renal and vascular complications, (3) chronic tubal or interstitial nephritis, (4) various forms of arthritis and “chronic rheumatism,” (5) various forms of painful neuritis and peri-neuritis, (6) chronic bronchitis and emphysema, (7) people lately returned from tropical countries, (8) delicate children.

The Mineral Water and its Action.—Bath water may be described as a hypotonic, “simple” thermal water, with relatively high calcium content. It issues from three separate springs, of practically identical chemical and physical characteristics. They yield between them over half a million gallons daily.

Chemical Characteristics.—The following analysis, made at the *Lancet* laboratory, is the most recent.

| | Grains per Gallon. | Parts per Thousand. |
|--------------------------|-----------------------|------------------------|
| Calcium Sulphate . . . | 102·880 | 1·47 |
| Strontium Sulphate . . . | 2·030 | ·03 |
| Sodium Sulphate . . . | 23·500 | ·33 |
| Potassium Sulphate . . . | ·207 | ·003 |
| Calcium Carbonate . . . | 8·750 | ·12 |
| Magnesium Chloride . . . | 15·800 | ·22 |
| Sodium Chloride . . . | 9·080 | ·12 |
| Lithium Chloride . . . | ·120 | ·001 |
| Silica | 1·960 | ·02 |
| Bromine | traces | traces |
| Nitrates | none | none |
| Carbonate of Iron . . . | 1·600 | ·22 |
| <hr/> | | <hr/> |
| Total mineral matters . | 165·927 | 2·37 |

GASES.—Argon. 14 parts per 1,000.

Helion. 1·2 parts per 1,000.

The above gases were demonstrated by Prof. Sir James Dewar, who also found traces of krypton and xenon.

Physical Characteristics.—When fresh, the water is clear, odourless, and almost tasteless. Seen in bulk, it has a slight yellowish-green coloration.

It emerges from the earth at a temperature of 114° to 120° F. (45·5° to 49° C.), and is unique as the only natural *h_o* water in the British Islands.

The density of the water from the King's Well is 1·0166. Osmotic pressure equivalent to that of a salt solution containing per litre 1·09 gram NaCl.

Radio-activity.—The Hon. R. Strutt demonstrated radium in appreciable quantities, both in the waters and in their deposits.

Sir William Ramsay has supplied the following figures as a result of recent investigations of the Bath waters and the gases issuing from them.

| | Milligram per million Litres. |
|--|----------------------------------|
| Radium in the water of the King's Spring | 0·1387 |
| Niton (radium emanation) in ditto | 1·73 |
| „ „ „ Cross Bath | 1·93 |
| „ „ „ Hetling Bath | 1·70 |
| „ „ „ gas from King's Well | 33·65 |

These figures are notable as showing that the amount of radium emanation (niton) in the Bath water is twice as great, and in the gases arising therefrom, such as are used for inhalation, four times as great, as in any mineral water examined up to the present time in Great Britain.

It is pointed out by Sir William Ramsay that it is impossible to compare any of these figures with the statements of the radio-activity of foreign waters, owing to differences in the apparatus employed for estimation, as well as in the standard units.

Pharmacology.—The chief physical and chemical peculiarities of the water, as indicated by the above reports and analysis, may be summarized as follows: (1) Absence of unpleasant taste and smell, (2) high natural temperature (120° F.), (3) relatively high percentage of calcium salts, (4) the extremely small amount of sodium present, (5) presence of minute quantities of iron salts, (6) high degree of radio-activity.

High Proportion of Calcium.—The calcium salts, which constitute the chief mineral ingredients, are contained in a soluble form, which probably ensures their free assimilation. The importance of calcium in all forms of metabolic activity is so great that the relatively large calcium content of the Bath waters is probably an important, though little recognized factor in their therapeutic action. Calcium salts have been proved to cause diminution in the amount of urinary phosphates, owing to the combination of the calcium with phosphates in the bowel, both before absorption and after re-excretion in the colon. This decrease in urinary phosphate is entirely confined to the mono-sodium (uric acid precipitating) phosphate. The di-sodium phosphate, which, on the other hand, is capable of dissolving uric acid, is thus left free in relatively increased quantity to exert its beneficial effect. Thus, the high calcium content in the Bath waters probably has an important bearing on their capacity to promote the elimination of uric acid.

Low Percentage of Sodium.—It is a well-established fact that the percentage of sodium salts present forms the determining factor in the precipitation of sodium biurate from serum and synovial fluid. In virtue of its extremely low sodium content, Bath water exerts an important action in preventing the deposition of urates in the tissues, and in aiding the absorption of any pre-existing uratic deposits.

Iron and other Mineral Constituents.—These occur in such small quantities that their therapeutic value is problematical. The improvement in anæmic conditions which is brought about by a course of the waters is to be attributed more to a thorough irrigation of the tissues and to the removal of toxic material than to the minute percentage of iron which the waters contain.

Radio-activity.—The researches of Sir William Ramsay, as we have seen, afford proof that one of the most remarkable properties of Bath water is its radio-activity. The exact clinical significance of this fact can hardly be determined till our knowledge of radio-therapy, as applied to metabolic disorders, has been placed on a firmer foundation. It has, however, been long recognized that the therapeutic properties of the so-called simple, or indifferent, mineral waters, cannot be fully expressed in terms of their chemical content, and in view

of the recent experiments of His and others, showing the remarkable activity of radium emanation in promoting the disappearance of uric acid from the blood, and the re-resolution of uric acid concretions, it is not illogical to infer that the high degree of radio-activity possessed by a water such as that of Bath constitutes at any rate an important factor in determining its value in the cure of gouty and "rheumatic" conditions.

Physiological Action. (1) *On the stomach.*—The action on the stomach is mainly physical, flushing the organ with a warm non-irritating fluid, hastening the passage of its contents through the pylorus, diminishing secondary fermentation of carbo-hydrates, and cleansing the wall of the viscus preparatory to the next meal. In common with other hypotonic waters, it probably causes temporary increase in the flow of hydrochloric acid and ferments. It has no aperient effect in the amounts usually prescribed.

(2) *On the tissues.*—In addition to their physical action in irrigating the tissues and promoting the removal of toxic material, Bath waters have peculiar properties, as above indicated, in preventing the deposition of urates in the system.

(3) *On the kidneys.*—The ingestion of the water is rapidly followed by free diuresis, to which is largely due its value in gout, and other conditions characterized by faulty elimination.

Mode of Employment. *Internally.*—Ten to twenty ounces are usually given twice daily. If no unpleasant effects follow, the dose may be cautiously increased, the diuretic effect being the best index of the advisability of giving larger quantities or not. Owing to its low molecular density, it is best taken towards the completion of gastric digestion, not less than two hours after a meal.

Therapeutic Action in (1) *Gastric disorders.*—Taken in judicious amount and at suitable times, Bath waters increase the appetite and improve digestion.

In cases of chronic gastric catarrh, associated with hyperacidity and secondary fermentation of carbo-hydrates, they may be freely given with considerable benefit; but in debilitated patients with gastric atony and deficient secretion, the amount must be cautiously regulated to avoid nausea, headache and anorexia.

(2) *Gout.*—Taken over a reasonably long period the water

causes marked amelioration of the symptoms associated with chronic articular gout, and produces definite improvement in that large class of cases in which the varied symptoms of irregular gout have resulted from injudicious diet, lack of exercise, and deficient excretion.

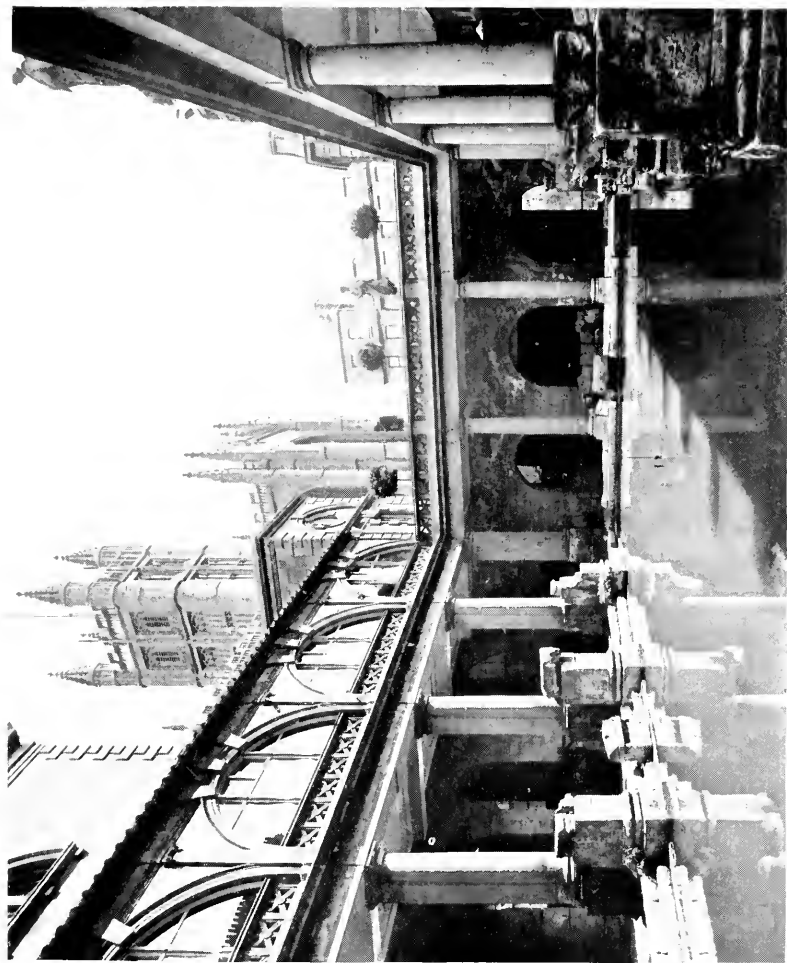
(3) *Gouty glycosuria*.—Its action in causing the diminution and disappearance of sugar in cases of so called “gouty” glycosuria in the middle-aged, apart from coincident alteration in diet, has been amply demonstrated, and constitutes one of the most valuable properties of the water.

(4) *Arthritis deformans*, “*chronic rheumatism*,” and *fibrositis*.—The diuretic effect renders it a valuable adjunct to the balneo-therapeutic treatment of the various forms of arthritis and chronic rheumatism, more particularly of so-called muscular rheumatism, and cases of osteo-arthritis occurring in women about the time of the menopause.

(5) *Renal calculus*.—Its chemical action in retarding uratic deposits in the kidney has been explained above. By its diuretic effect it physically prevents the formation of concretions of urates, and helps to remove any that have already formed. As its administration never renders the urine alkaline, it may be freely given without fear of causing a deposit of phosphates.

(6) *Anæmia*.—Definite improvement follows a course of the waters in simple anæmia and chlorosis.

Bathing Establishment.—The bathing establishment comprises three separate suites of baths : the Queen’s, New Royal and Hetling, situated close together and supplied by the same springs. Attached to the Queen’s Bath are the Grand Pump Room, where the waters for drinking purposes are dispensed from a fountain supplied direct from the King’s Bath Spring ; and the Roman Promenade, comprising Concert Hall, drawing-rooms, smoking-rooms, and covered promenade overlooking the large Roman Bath. The bathing and dressing-rooms in the various suites of baths are artistically designed and furnished, and pleasant “cooling rooms” are provided, where patients may rest before leaving the buildings. The bathing establishment is fully equipped with all appliances for the scientific administration of balneotherapeutic and allied forms of treatment, and in the provision made for the comfort



BATH, THE GREAT ROMAN BATH.

and convenience of patients these baths compare favourably with those of any other British or foreign spa.

Special Characteristics of the Baths.—(1) Owing to the abundant supply, patients are able to enjoy all the advantages of a course of baths consisting entirely of a naturally heated, radio-active mineral water. Special arrangements are made to regulate the temperature of the baths without the addition of water other than that derived from the springs.

(2) The various vapour baths are composed of the natural radio-active vapour and gases arising from the mineral springs.

(3) The “deep immersion” baths have always been a special feature of treatment at Bath. Each bath contains 800 to 900 gallons of mineral water, in which the patient stands and moves about freely. The hydrostatic pressure of this mass of water exerts important effects on the circulation, and by the uniform support it affords to the limbs, greatly increases the range of movement of painful and sensitive joints. Combined with the “submerged douche,” this bath is a most effective form of treatment for various types of chronic arthritis and gout.

The following forms of bath, all of which are administered by specially trained attendants, are available: Reclining, deep immersion, deep immersion with under-current douche, Nauheim, Aix douche-massage baths; Vichy douche-massage; local, Scotch and Plombières douches; cabinet natural vapour baths. Also, medicated baths, of pine, sulphur, bran, oatmeal, or fuller’s earth; electric water baths (sinusoidal current), local inhalations (natural vapour); local packs of mustard or fuller’s earth; electric hot air, and radiant heat baths; and, finally, three swimming baths (mineral water) of different temperatures. Trained masseurs administer massage during or after the bath when prescribed.

A well-equipped Zander institute, with appliances for the passive movements of joints, is attached to the establishment.

Intestinal irrigation (Plombières system).—This form of treatment has recently been introduced, with highly successful results, and it is interesting to note that the waters of Bath closely resemble in composition those of Plombières.

Cases for which the Baths are specially indicated.—Besides the value of the mineral waters in hydrotherapeutic treatment generally, their use in baths has proved peculiarly suitable

for : (1) the various stages of articular and abarticular gout, (2) the different forms of chronic arthritis, (3) sciatica and other forms of neuritis, (4) lead poisoning, (5) stiffness and limitation of movement following injuries to joints, (6) various forms of chronic skin disease.

The natural vapour inhalations are used with considerable success in chronic forms of rhinitis, pharyngitis and laryngitis.

Contra-indications.—Acute conditions of joints; tubercular arthritis; advanced cardiac disease; aneurism.

Attractions and Recreations.—The City of Bath in itself offers many attractions, of which its many literary and historical associations are not the least. The carefully preserved remains of the extensive system of Roman baths, together with the valuable collection of coins and other relics of Roman and Saxon times, are of great archæological interest. The city as it existed in the Georgian times remains intact in its characteristic features, including many houses of men notable in history.

High-class music has always been a special feature at Bath. From October till May, vocal and orchestral concerts are held daily in the Concert Hall of the Roman Promenade; in addition to which music is provided daily in the Pump Room, during the hours when patients are drinking the waters. Concerts and other entertainments are frequently held in the Assembly Rooms during the winter months.

First-class companies perform throughout the year at the Bath Theatre, one of the best appointed in the provinces. The Holborn Museum, Victoria Art Gallery, and Literary and Scientific Institution, are all open to visitors and contain many pictures and other objects of interest. Valuable reference libraries are attached to the two last.

Outdoor Amusements.—The Beaufort Hunt, Avon Vale Hunt, Bath Harriers, and several other packs are within easy reach.

Two excellent golf courses are close to the town.

Tennis, croquet and boating may also be obtained in the summer, and roller skating in the winter.

Excursions.—The following places, within easy distance by train or motor, are well worth visiting: Wells Cathedral, Glastonbury Abbey, Cheddar Gorge, Longleat, Bradford-on-

Avon, Lacock Abbey and village, Avebury, Castle Combe, Badminton and others.

Contributed by the Bath Medical Committee.

Bath, Somerset. Population, 69,000.

Height above sea-level, from 84 to 750 feet, the greater part of the town being at from 150 to 350 feet.

Bathing establishment open all the year round. Seasons for bathing, spring and autumn—summer for selected cases only.

Mean temperatures (10 years), winter 41° , spring 52° , summer 59° , autumn 45° . February is the coldest month—average mean temperature, 40° ; July the hottest, average mean temperature, 61° .

Mean annual sunshine, 1,589 hours. Mean annual rainfall, 30·49 inches.

Distance from London, 107 miles. Time of journey, 2 hours.

For general information apply to the Enquiry Bureau, Baths' Office, Bath.

Hotels.—Empire Hotel; Pulteney Hotel; Lansdown Grove Hotel.

BRAEMAR AND DISTRICT (DEESIDE), WITH GRANTOWN AND DISTRICT (SPEYSIDE).

BRAEMAR.

Braemar.—The village stands in a hollow, well above the river Dee, at an altitude of 1,114 feet in the higher part of Deeside. The valley is open to the south and north-east, and sunshine, therefore, is not excluded even in the late autumn. The place affords many sheltered walks and good facilities for hill climbing. The mean temperature of the summer months, June to August, is $53\cdot9^{\circ}$ —exactly 8 degrees lower than in London. The rainfall is 35·8 inches, of which the greater part occurs in the autumn and winter months. May and June are usually dry and sunny (mean relative humidity of June, 57·8 per cent.).

The atmosphere of Braemar, like that of Upper Deeside in general, contains an unusual proportion of ozone, which is attributed to the frequency of thunderstorms in the higher mountains. It has been described as “one of the most bracing summer resorts of Great Britain” (Weber). The season is from June to September; but May, June and October are probably the best months from a health point of view, here and elsewhere in the north-east of Scotland. Braemar is to be recommended for convalescence from acute illness (under supervision), for neurasthenia, for many cases of anæmia, and for gouty and gastric disorders, especially when there is a neurotic element; and also as a place of “after-cure” following spa treatment. It is contra-indicated where the blood pressure is excessive, in advanced arterial degeneration and failing compensation of the heart; also in diabetes. It is often said that the air in Upper Deeside is “too strong,” and it is to be remembered that those who go there in a low, fatigued or exhausted condition require first of all a period of acclimatization and rest. In advising invalids, it should be taken into consideration that Braemar is 16 miles by road from the rail-

way terminus at Ballater, and that the shortest route is from Perth by motor, *viâ* the Spittal of Glenshee.

Ballater, nearly 400 feet lower in elevation than Braemar, is a good centre for walks and longer excursions up the glens (Lochnagar, Tomintoul and others). Indications as for Braemar.

Aboyne (390 feet), on the lower reaches of the Dee, is 30 miles from Aberdeen. The climate is dry and bracing, the rainfall 29 to 30 inches. It is well sheltered by hills and pine-woods, affording pleasant and secluded walks, and has a good golf course. The climate is especially recommended for cardiac and respiratory cases.

About 15 miles nearer the sea is **Banchory**, with its famous sanatorium for tuberculosis.

GRANTOWN.

Grantown-on-Spey (altitude 720 feet).—Grantown enjoys an open situation on heath-covered moorland, the valley being wider and the hills farther apart than elsewhere on Speyside. There is much pine forest with sheltered foot-paths. The rainfall is 31·66 inches, the soil a dry gravel. Fog and mist are rare. The autumn months upon Speyside are usually very bracing and dry. In comparison with Deeside (*vide* "Braemar") this district is more wooded, and the climate generally rather more equable. The general elevation is rather lower, and there is less exposure to east wind. As it is traversed by the Highland Railway, it is also much easier of access to invalids. The climate of Speyside is more particularly indicated for the convalescence from severe illness and for bronchial and pulmonary affections (asthma, catarrh, and tuberculosis). Some rheumatic cases do well in summer, also many cases of insomnia and neurasthenia. Those requiring rest and quiet on account of nervous overstrain and debility are greatly benefited by the stillness of the woods and the privileges extended to visitors, who can roam about the country without hindrance.

Carr Bridge (850 to 915 feet) is situated in a side valley of the Spey, well sheltered among woods of pine and fir.

Nethy Bridge (730 feet), five miles from Grantown, is also

thickly wooded, and lies under the shelter of the Cairngorm Mountains.

Aviemore (720 feet) stands a little farther up the river Spey, and is a junction of the Highland Railway. It is surrounded by the Monadhliath and Cairngorm Mountains (Ben Macdhui, 4,298 feet). The village is somewhat exposed to the westerly winds, but good shelter and pleasant walks are found in the dense woods of Rothiemurchus.

Hotel.—The Aviemore Station Hotel.

Kingussie (745 feet) occupies a wide strath in the upper part of Speyside, seven miles north of the Grampian Pass, and well sheltered on the north and west. The rainfall is 29 inches, and the air is described as “crisp and bracing.” Catarrhal affections of the throat and chest are particularly indicated, and pulmonary phthisis may, at the Grampian Sanatorium, be treated even in winter with much advantage.

Hotel.—The Duke of Gordon Hotel.

The above-named resorts are perhaps the most important and representative in this region; but, in point of fact, the entire north-east of Scotland from the Dee to Dornoch may be regarded as one great health resort. It includes climates of a bracing quality with which a sedative influence is subtly mingled. Over the whole of this area the rainfall is low, sinking to 24 inches on the shores of the Moray Firth, and on the mountains and moorlands but little exceeding 30 or 35 inches.

Through the rocky uplands of this region run the two rivers Spey and Dee, and the chief inland health resorts of the north-east, rising from 500 to 1,000 feet above sea-level, are grouped for the most part on Deeside and Speyside. It should be remembered that in the north of Scotland these moderate elevations correspond in their climatic effect to much higher altitudes in countries of more southern latitude, such as Switzerland; while the more northerly situation affords in summer about one additional hour of daylight in each twenty-four.

The mountainous part of Deeside (above Aboyne), long valued for its health-giving qualities by the people of Aberdeen, was in ancient times a favourite retreat of Scottish kings and chieftains. It was not until a much more recent

period that the district began to receive general recognition, which dated from the middle of the last century, when Queen Victoria, acting on the advice of her physician in Scotland, Sir James Clark, chose Balmoral (near the head of Deeside) as a summer residence. The greater part of the valley of the Dee lies high above sea-level, the soil being gravel or sand upon granite, and drying very rapidly after rain. It is surrounded on three sides by the Grampian Mountains, rising to 4,300 feet. The scarcity of pasture and even of peat on their rocky surface gives to the atmosphere a certain dryness and freedom from mists. It was once covered by vast pine forests, of which portions still remain. Pine, birch and heath are the prevailing plants.

The comparative dryness of the climate of the north-east of Scotland is due to the fact that the prevalent rain-bearing winds from the Atlantic are deprived of a great part of their moisture in passing over the mountains that lie for many miles to windward. The soil is porous, usually of sand or gravel overlying granitic and other primary rocks, or sandstones and slates. There is therefore but little ground mist or fog.

The atmosphere of all this region is pure, free from dust, and singularly transparent to the solar radiation. No meteorological instruments are fine enough to detect and to record its peculiar quality, but living organisms at once respond to it. The northern air gives an added brightness to the colours of birds and flowers; it produces in man a feeling of exhilaration, of added capacity for exertion, increased appetite and sounder sleep. The medical value of the climate is shown by increasing the resistance to the development both of morbid tendencies and of chronic diseases. For the glandular and catarrhal ailments of delicate children, for the early stages of pulmonary tuberculosis, for the asthenias of middle-aged and elderly persons who have not lost the power of reaction to stimuli, experience has amply demonstrated its tonic and recuperative value.

The writer desires to express his acknowledgements for valuable local reports to Drs. William Brown (Aberdeen), Brodie Brown, Alex. Hutchinson and W. de Watteville.

R. F. F.

BRIDGE OF ALLAN.

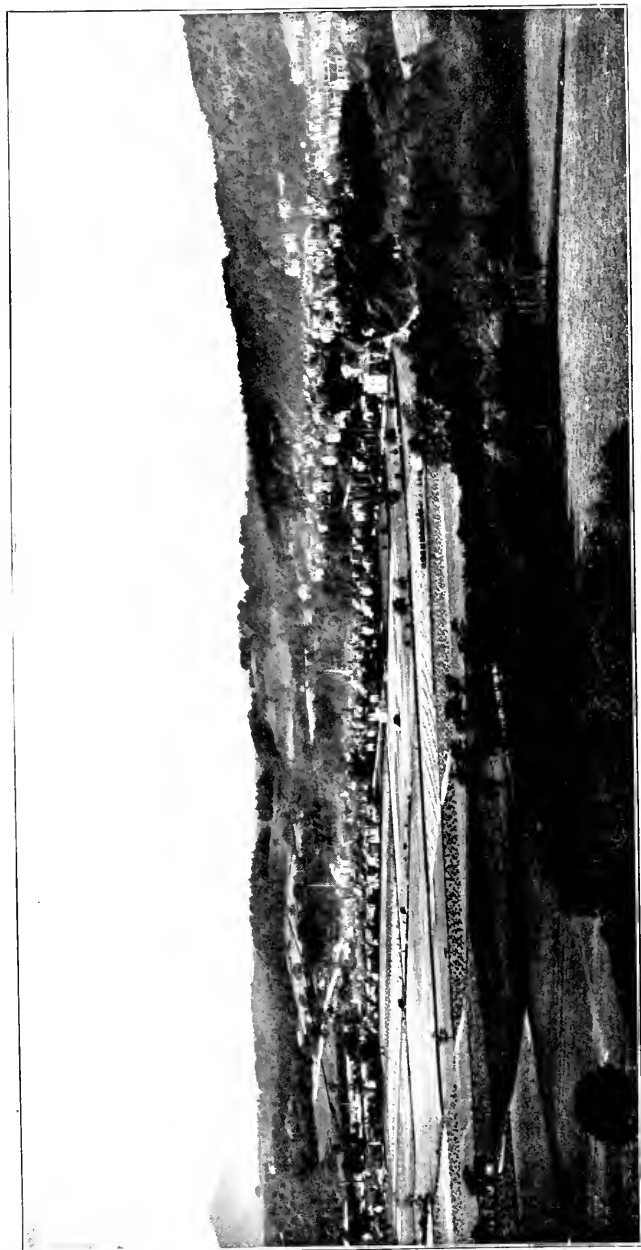
Mineral Water : Muriated.

General Characteristics. — At the beginning of the present century, Bridge of Allan was but a small hamlet, situated on either side of the bridge and river from which it derives its name. The following quaint description, taken from Chambers's *Picture of Scotland*, gives us a glimpse of the village as it was fifty years ago : " We could particularise Bridge of Allan as everything that a village ought to be—soft, sunny, warm, a confusion of straw-roofed cottages and rich massy trees : possessed of a bridge and a mill, together with bee-skeps, colliers, callants, old inns with entertainment for man and beast, carts with their poles pointing up to the sky : venerable dames in drugget, knitting their stockings in the sun, and young ones in gingham and dimity, tripping along with milk pails on their heads. Besides all these characteristics as a village, the Bridge of Allan boasts of a row of neat little villas, for the temporary accommodation of visitors who flock to it in summer on account of a mineral well." The modern town is very different from the old-fashioned place of the above description.

As it is to-day, the lodging-houses are, for the most part, villas, self-contained and situated in their own grounds ; so that free circulation of air is secured. The main portion of the town lies in the valley, but there are numerous villas built on the hills, which face south, and so obtain all the sun.

Climate. — The most important claim to recognition as a health resort which Bridge of Allan possesses, rests on its exceptional climate. That the air of the district is surprisingly free from organic impurity has been recognized for generations. In addition, however, owing to the local conditions, its climate differs completely from that of places in the immediate neighbourhood.

More persuasive than commendation locally written, will be



BRIDGE OF ALLAN.

(To face p. 26.)

the evidence of Buchan, who, in his text book of Meteorology, writes as follows :—

“ Bridge of Allan owes its celebrity to the well-wooded heights behind it, sheltering it from the east winds, and to the sloping nature of the ground on which it is built. From its sheltered position, the east wind passes over it at a reduced rate and force, and there being, consequently, less evaporation, our bodies are deprived of less heat, and thus the sensation of greater warmth is a reality. Again, being built on rising ground, the cold air flows down to the valley below it, so that excessive cold rarely occurs. These advantages not only give greater facility for open-air exercise, but by offering, to an extent, protection from the hurtful effects of the weather most trying to invalids, viz. east winds and the severe cold winter, are far more to be prized than would be an annual temperature several degrees higher.” The surrounding soil—heavy carse land—also exerts its influence in preventing extremes of heat or cold.

Mild, equable and dry, the climate renders an open-air life possible at all seasons. There are many places where such a life is possible during the greater part of the year; but the intermediate position which Bridge of Allan occupies between the bracing and relaxing, renders it peculiarly effective for invalids.

Recreations.—It possesses a splendid golf course, lawn tennis courts, bowling and croquet greens. To make up for the want of amusements found in gayer resorts, its proximity to Sheriffmuir, Cambuskenneth, the Wallace Monument, Stirling Castle, and other such places, adds interest to the exercise of walks in the neighbourhood. There are some beautiful residential estates near by, which are generously thrown open to visitors on certain days every week.

Mineral Waters.—In addition to its climate, Bridge of Allan has, in its spa, a further claim to recognition as a health resort. From the extract already given we have seen that the healing properties of the water were widely known in the early part of the last century. In fact, it is not too much to say that half a century ago the place was pre-eminently the spa of Scotland, and that most of the people of Scotland thoroughly believed in the mineral wells there. The following—

the most recent analysis—shows that its water is practically isotonic.

| | Grains per Gallon. | Parts per Thousand. |
|-----------------------------|-----------------------|------------------------|
| Chloride of Calcium . . . | 266·94 | 3·813 |
| „ Sodium . . . | 341·25 | 4·875 |
| Sulphate of Lime . . . | 24·15 | ·345 |
| Carbonate of Lime . . . | 8·75 | ·125 |
| „ Magnesium . . . | 1·48 | ·021 |
| Bromide of Magnesium . . . | 5·00 | ·071 |
| Chloride of Magnesium . . . | 9·22 | ·131 |
| Silica | ·32 | ·004 |
| | <hr/> 657·11 | <hr/> 9·385 |

The well-house is situated on the level plateau above the town. The water is collected from three springs into a tank at the bottom of a somewhat deep shaft, to which access is gained from the well-house. This shaft may be descended, on permission, and an idea obtained by actual inspection of the arrangements made for the collection of the water. From the tank into which the springs are led, the water is pumped up each morning into the well-house, ready for the visitors who regularly repair there for their morning draught.

The water possesses a distinct but quite agreeable saline taste, has no odour, is colourless, and is very easily taken; many, indeed, finding it much more palatable than pure hot water. Objections have been made that the taste varies. This apparent variation must be due to alterations in its temperature, or to the state of health of the patient.

Whether at the well-house or after transportation to a distance, the water remains in the same condition as at the bottom of the shaft. It is, therefore, not surprising that large quantities are bottled for consumption elsewhere.

The late Prof. Sir Robert Christison, discussing the properties, diuretic as well as cathartic, of purgative waters, closed his remarks by saying: “They may be usefully employed in the ordinary course of practice, as I have often experienced with regard to the powerful purgative waters of Bridge of Allan.” Unlike those which owe their aperient action to sulphate of sodium, these waters possess stomach strengthening

properties of a very valuable nature. In moderate doses they tend to sharpen the appetite and to stimulate digestion, as they supply materials from which gastric fluid is formed. In cases of habitual constipation, no matter how engendered, a better remedy can not, in my opinion, be found than the waters of this spa, which do not require additional medicinal agents to bring back the alimentary organs to their normal healthy condition. Nor does their influence cease when they have acted as an aperient. Some of the constituents are retained and are made use of in rebuilding those inorganic elements which are constantly wasting away. They are strongly indicated in catarrhal affections of the stomach and bowels, associated as these often are with free secretion.

The waters in saline strength approximate closely to that of the normal serum of the body, and are not only readily absorbed, but are capable of dissolving mucus, and so cleansing any surface with which it may be coated. In chronic heart disease where the liver is apt to suffer venous engorgement, they help to give relief; and by the drain from the intestinal veins, they mitigate the tension, and so relieve the pain of hæmorrhoids. Cases of neurasthenia have been much benefited by the external and internal use of these waters.

It will be observed that they are very rich in calcium salts, for which they form an agreeable medium of administration; and they can be employed in cases of purpura, hæmophilia, and other cases where there is passive oozing of blood from mucous surfaces or under the skin.

The waters can be advantageously used in various skin affections, especially if of a chronic type, such as dry eczema, acne and dermatitis. For cases of subacute and chronic gout and rheumatism they are eminently well suited. Diseases peculiar to women derive much good from their internal and external use. In chronic inflammation of the pelvic organs they are much employed, in the form of hot douches and hot sitz baths.

Baths.—Of late years there has been a progressive increase in the demand for baths, which has necessitated a complete reconstruction and increase of the bathrooms; excellent suites of baths of the most modern type, with up-to-date appliances, having been introduced.

The rooms are tastefully decorated and comfortably heated. Skilled male and female attendants are present throughout the year.

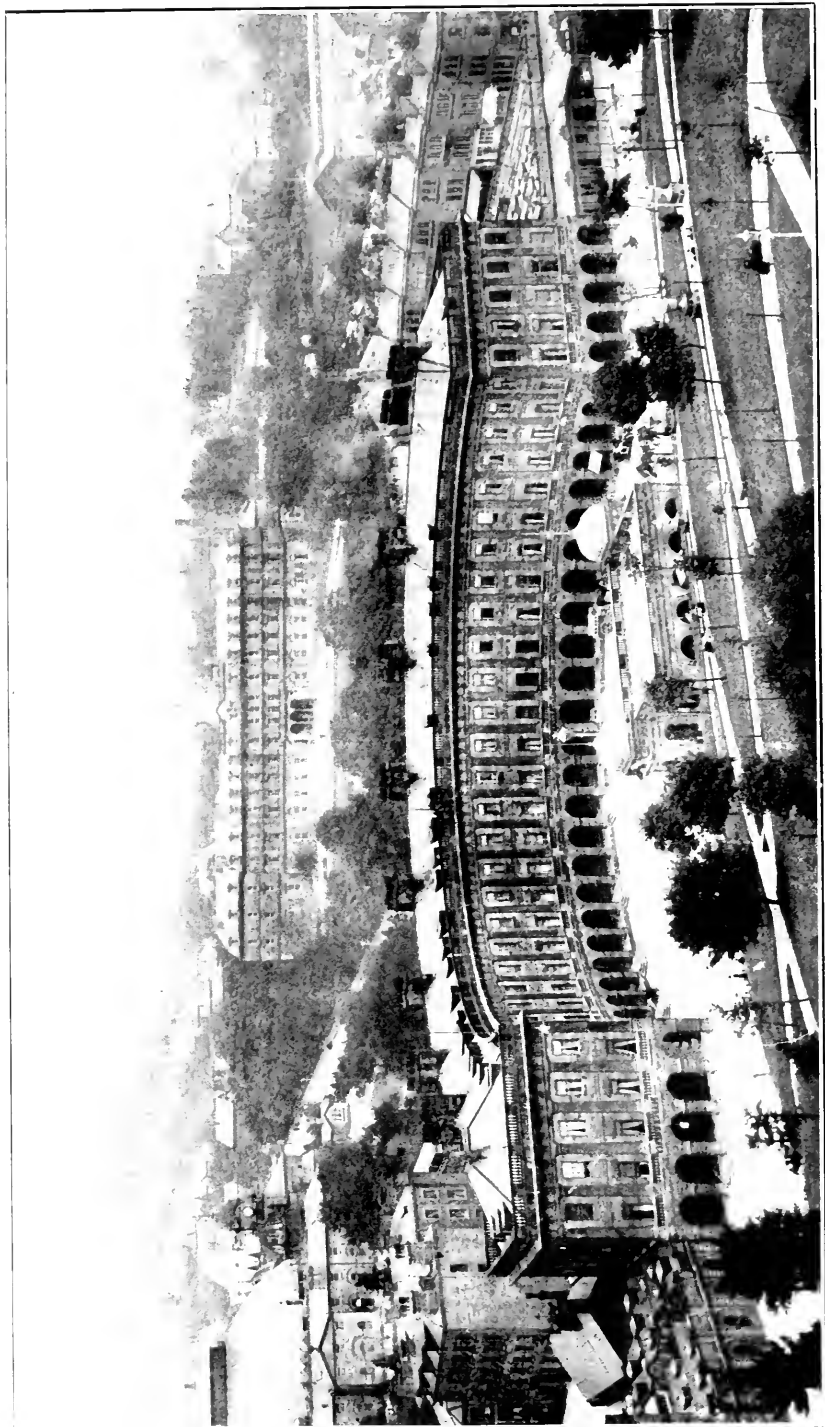
WILLIAM HALDANE, M.D., F.R.C.P.E.

Bridge of Allan, Stirlingshire. Population, 3,121. Height above sea-level, 128 feet. Distance from London, 420 miles. Time of journey, 9½ hours. Bath establishment open all the year round.

Mean annual temperature, 46.8°. Sunshine, 1,023 hours. Rainfall, 39 inches.

For general information apply to Hon. Sec., Bridge of Allan Mineral Wells Co.

Hotel.—The Bridge of Allan Hydropathic Establishment.



BUXTON, GENERAL VIEW.

BUXTON.

Mineral Waters : Simple, radio-active. Chalybeate.

History. — Situated in the centre of the Peak district of Derbyshire, Buxton is popularly known as “The Mountain Spa.” From remains of Roman villas, baths and other buildings which have from time to time been found in the vicinity, it would appear that the Romans knew and appreciated the healing virtues of its thermal springs. The neolithic barrows in the neighbourhood have yielded interesting relics of a yet more remote age, and it is even claimed that the reputation of the waters has descended undimmed through the centuries from prehistoric times. In the early part of the Christian era the springs were dedicated to St. Anne, “who gave health and living great to those who love her most.” The town is mentioned in the Domesday Survey as Bawkestanes, but it is not until the Tudor period that Buxton begins to make any figure in important records. Soon after the accession of Queen Elizabeth the baths and wells attained great popularity and began to be resorted to by the nobility and gentry. It was at this time that Dr. John Jones, an eminent physician of the period, took charge of the spa, and published, in 1572, the first handbook of its waters, under the title *The Benefite of the Ancient Bathes of Buckstones*. His most illustrious patient was Mary, Queen of Scots, who visited Buxton at least four times. On the last occasion, in 1583, she is said to have inscribed upon one of the windows of the room she occupied the following couplet :—

“Buxtona, quæ calidæ celebrabere nomina lymphæ
Forte mihi posthac non adeunda, vale,”

which to-day is included in the arms of the town, and may be thus translated :—

“Buxton, whose fame thy milkwarm waters tell,
Whom I, perhaps, no more shall see, farewell.”

Unfortunately, the registers of Dr. Jones and all other docu-

mentary records were destroyed 100 years later, and we are thus deprived of what would doubtless have been much interesting and curious information concerning Buxton and its waters.

General Characteristics.—The town, which is the highest in the United Kingdom, is dignified by the possession of a number of imposing buildings, among them the Crescent, which was erected in 1784 by the fifth Duke of Devonshire, to meet the growing popularity of the spa at that period. It gains further attractiveness from its beautiful gardens and the woods which clothe the hills to the north and west, as well as from the fact that it is scrupulously well kept. Owing to the limestone formation, its roads dry very rapidly, even after the heaviest showers; one of the reasons for that exceptional cleanliness which must strike the visitor as a characteristic of Buxton. The surrounding country is typical of the Peak district, in its grandeur and boldness of outline.

Climate.—The climate is remarkably dry and bracing. In consequence of the altitude the air is light and exhilarating. The rainfall is above the average, but, owing to the hilly character of the town, the surface drainage is very rapid, and as the limestone rock is non-absorbent there are none of the drawbacks of a damp subsoil. These factors are of great value in rheumatism, and especially in rheumatoid arthritis, both of which diseases are rare among the inhabitants. The record of sunshine is usually high. The temperature is always a few degrees cooler than on the lowlands, a not unpleasant feature in summer; while in winter the dryness of the air renders the keenest frost bracing and enjoyable. The Buxton season is more especially a summer one, but the baths are open throughout the year, and many people find the "cure" equally advantageous in the winter and spring. The frequent frosts and heavy snowfalls afford the excellent sports, not often obtainable in this country, of sleighing, ski-ing, tobogganing, skating and curling. A new tobogganing run has now been constructed, on the lines of the famous Cresta run, and is the only one of the kind in the British Isles.

Mineral Waters.—The Buxton waters belong to the radioactive thermal group in which are included those of Bath, Gastein, Wildbad, Plombières, and other places; but they

possess also features in common with the earthy waters of Contrexéville, Vittel and Evian. They issue from nine springs, and from one of these alone about 2,000,000 litres flow daily. A regular supply of radium emanation is thus constantly kept up—an important point in comparing these waters with artificial radio-active baths, which rapidly lose their activity and so deteriorate.

The waters emerge from the earth at a uniform temperature of 82 degrees. They are alkaline in reaction, and of low specific gravity. When seen in mass, they are clear, and of a peculiar blue colour, and large bubbles of gas continually rise and discharge on the surface. This gas consists of nitrogen and carbon dioxide, and also contains argon, helium, neon, and other rare elements. The radio-activity of the gas is about ten times that of the water, and is evidently the vehicle of the radium emanation to which the name “niton” has been given.

The most recent analysis of the mineral constituents is by Dr. Thresh :—

| Analysis :— | Grains per Gallon. | Parts per Thousand. |
|------------------------------|-----------------------|------------------------|
| Bicarbonate of Calcium . . . | 14.10 | ·2001 |
| „ Magnesium . . . | 6.02 | ·086 |
| „ Iron . . . | ·03 | ·004 |
| „ Manganese . . . | ·03 | ·004 |
| Sulphate of Barium . . . | ·05 | ·0007 |
| „ Calcium . . . | ·26 | ·00027 |
| „ Potassium . . . | ·62 | ·0086 |
| „ Sodium . . . | ·84 | ·012 |
| Nitrate of Sodium . . . | ·03 | ·0004 |
| Chloride of Calcium . . . | ·02 | ·0003 |
| „ Sodium . . . | 3.10 | ·044 |
| „ Ammonium . . . | trace | |
| „ Magnesium . . . | ·95 | ·0135 |
| Silicic Acid . . . | ·95 | ·0135 |
| Organic Matter . . . | ·02 | ·0003 |
| Carbonic Dioxide . . . | ·20 | ·0029 |
| Nitrogen . . . | ·19 | ·0024 |
| | <hr/> | <hr/> |
| | 27.32 | ·3895 |

Lithium, Strontium, Lead and Phosphoric Acid—traces.

The amount of gas given in this analysis is that which remains

dissolved in the water at ordinary pressure, but the gas which is given off in considerable quantity at the mouth of the springs is almost pure nitrogen, the analysis being—

| | |
|------------------------|-----------------|
| Nitrogen | 99·12 per cent. |
| Carbon Dioxide | ·88 per cent. |

which is explained by the much greater solubility of carbon dioxide. The absence of oxygen is a remarkable feature; and for richness in nitrogen the Buxton water is pre-eminent.

The stones at the mouths of the springs are coated with a very dark brown mud which stains the skin on being rubbed between the finger and thumb. This was also analysed by Dr. Thresh and was found to consist of the higher oxides of manganese, together with barium, iron, calcium, and magnesium; traces of strontium, cobalt and other metals were met with; and also molybdenum, which has never before been detected in a mineral spring. Eighty per cent. of the mud consisted of manganese oxide.

The presence of these free gases in a nascent state, together with the recent demonstration by Lord Rayleigh of the presence of argon, helium, etc., and by Lord Blythswood of radium, may help to explain the action of these waters.

The waters have recently been examined for radium by Dr. Makower (of Professor Rutherford's laboratory, Manchester University). The amount present varies slightly with the particular spring, and also with the distance from the spring at which the water was collected. The principal springs gave the following results. The units used indicate the amount of radium in milligrammes capable of forming the radium emanation (niton) present in a million litres of water or gas.

The new supply to the Crescent Pump Room :—

| | |
|--------------------------------|------------|
| Gas collected from the surface | 10·9 units |
| Water | 1·2 „ |

Springs supplying the Natural Swimming Baths :—

| | |
|--------------------------------|-----------|
| Gas collected from the surface | 7·7 units |
| Water | 1·1 „ |

Number 4 spring, Natural Baths :—

| | |
|--------------------------------|--------------------------|
| Gas collected from the surface | 8·5 „ |
| Water | not separately analysed. |

It is probable that the strength of the different sources is identical, the differences being due to the difficulty of collection of the gas in its most active condition from a swimming bath containing 230,000 litres of water. It is impossible, as Sir William Ramsay points out, to compare these amounts with the statements of the radio-activity of foreign waters, owing to differences in the method of estimation.

Internal Action.—The molecular activity of radium is the most powerful of any known body; and it is probable that in combination with the above gases it sets up a corresponding activity in the peripheral nerve endings of the tissues of the skin, which is thence communicated to every part of the system. When radio-active water is drunk, the emanation permeates the whole body and can be detected in the expired air and in the urine.

The most marked physiological action of the Buxton waters is their diuretic effect. Not only is the quantity of urine increased by their use, but there is also a definite increase in the total excretion of urea and uric acid. This diuresis is an important factor in the reduction of blood pressure. Thus, cases of chronic gout, early contracted granular kidney, and early arterio-sclerosis are benefited by a course of the water. In regard to this diuretic effect, it should be noted that the waters are almost entirely free from chlorides. When taken in excess they produce, in gouty and other arthritic cases, a marked increase in the joint pains, fortunately only temporary. There may also be vertigo, restlessness, insomnia, palpitation and headache. These symptoms are not unlike those produced by an excessive dose of radium emanation; a point in favour of the theory which would explain the clinical action of these waters by their radio-activity.

The water has no purgative effect, but when given in large doses before breakfast often produces a gentle laxative action by purely mechanical means.

The Baths.—The bathing establishments and Pump Room, which are controlled by the Town Council, occupy a central position, within a mile of any part of the town. They are in two sections, the Natural and the Hot Baths. The Natural baths are so called because the water is there used in the natural condition as it emerges from the springs, the swimming and

private baths being of constantly running water. The throat and nose sprays are in this department. The hot baths, where the waters are raised to the temperature prescribed, comprise every form of modern therapeutic apparatus, and include Aix, Vichy, and Buxton douche-massage baths, Plombières douches, Bourbon-Lancy, Nauheim, moor, fango, vapour and immersion baths. An accessory department provides for electrical and similar treatments.

External Action.—The effect of bathing in the water, apart from the action of bathing in any water of similar temperature, depends upon the gases present and upon the niton which is inhaled in large quantities from the surface of the water and may perhaps permeate the skin also. On emerging from the natural bath, where the gas is present in the largest quantities, the skin is seen to be covered with minute bubbles of gas, which have a stimulating effect upon the cutaneous nerve endings. The niton or radium emanation is thus brought into the closest possible contact with the skin, and the conditions for its entering the system by this route are favourable. Sir W. Ramsay has suggested that by the use of a continuous electrical current a considerable dose of the emanation might be driven into the system by ionisation.

Diseases Treated.—The reputation of Buxton from the earliest times has been based on the effect of the waters in rheumatism, gout and kindred disorders. Taken internally, they have a powerful eliminant action in many toxæmic states, and urinary deposits of oxalate of lime, or uric acid, are rapidly removed, while the formation of uratic deposits in the body is checked. Bathing in the water assists in the elimination of uric acid and is beneficial in rheumatic and gouty conditions, and in neurasthenia. The baths are given either in running water at the natural temperature—the most powerful effect being produced in this way; or with the water artificially warmed—the latter method being used for more delicate patients and, in most cases, as a preliminary to the stronger natural baths. When combined with douching they exert a powerful effect upon local effusions and exudates in or around the joints, muscles or other structures, relieving stiffness and pain. The more chronic forms of myalgia and arthritis benefit greatly from the use of the Buxton douche-massage bath.

Vapour baths are also used in combination with the warm immersion baths, and the vapour, being prepared from the mineral water, has definite radio-active properties which add considerably to the effect. These combined baths are of especial value in gout, rheumatism and sciatica.

The peat (or moor) treatment is of value in rheumatoid arthritis, in chronic arthritis such as is common in the knee joints of women at the menopause, and in gonorrhœal rheumatism, etc., relieving pain and promoting absorption. It can be used with advantage, moreover, in those acute stages in which most forms of bath treatment are contra-indicated.

Nervous Diseases.—Sciatica, brachial neuritis and neuralgias of various kinds are treated with good results; and douche-massage has proved of great benefit in locomotor ataxy, peripheral neuritis and other grave diseases of the general nervous system. Such functional conditions as neurasthenia are benefited by the climate in conjunction with suitable hydrotherapeutic procedures.

Diseases of the Skin.—These, especially when associated with a gouty or rheumatic diathesis, are benefited both by external and internal treatment, the effect of which in psoriasis and eczema is often strikingly good.

Anæmic Conditions, and convalescence from acute or prolonged disease, are favourably influenced by the climate and the use of the chalybeate water.

Diseases of the Heart.—The Nauheim baths and exercises are available in Buxton, and prove very useful in many cases of heart disease, while their effects are often materially increased by those of the climate.

Tropical Diseases.—Buxton has acquired considerable reputation for the treatment of tropical and sub-tropical diseases, especially malaria and disorders of the liver. Here, again, the climate may claim a large share of the credit, though vapour and mineral baths, and the moor packs are of material assistance.

Colitis.—There is a close resemblance between the waters of Buxton and those of Plombières, and the reputation which the latter spa has gained in the treatment of muco-membranous colitis and similar disorders has led to the installation of a complete equipment of the douches and so on, as used there.

Results in no way inferior to those of the French spa are obtained.

Catarrhs of the Respiratory Tract are also treated with success by means of sprays of the finely divided mineral water on the lines of those at Ems, and the effect of the radium emanation thus brought into close contact with the nasal, pharyngeal and bronchial mucous membranes is probably an important factor in the production of the good results which are constantly experienced. The constitutional conditions which are commonly associated with such catarrhs are benefited by drinking the waters and by the mineral baths.

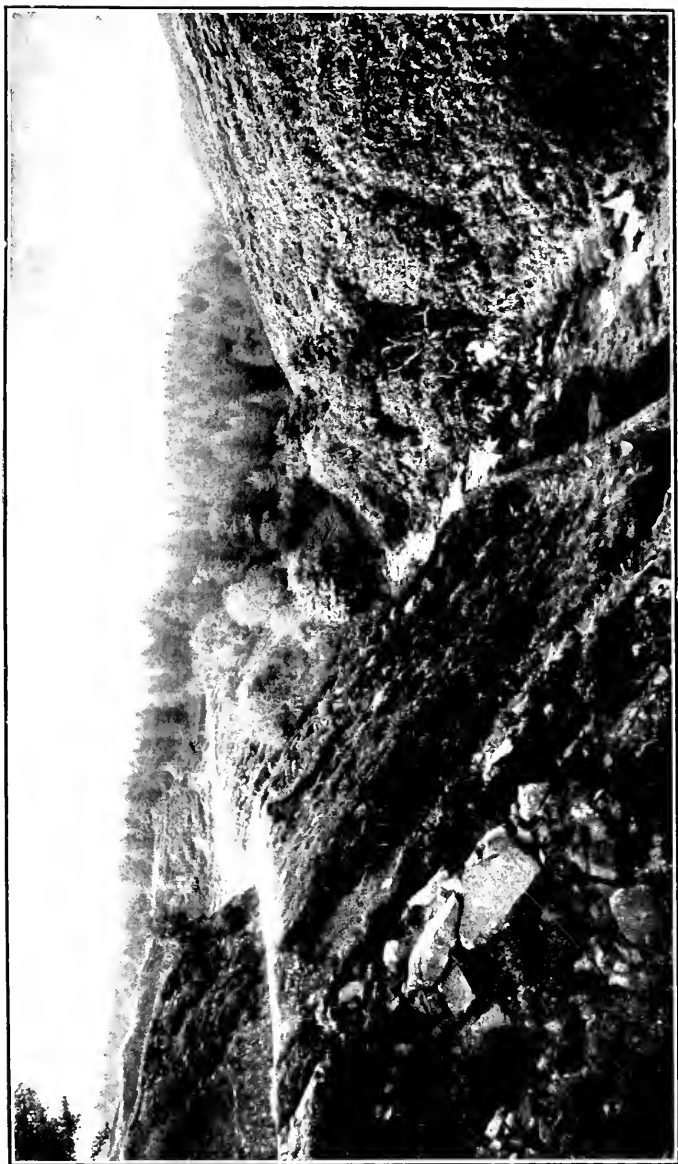
The Chalybeate Spring, to which reference has already been made, contains iron in the ferrous state held in solution by CO_2 . It is a useful hæmatinic and tonic which agrees well with almost all cases. It has also a considerable reputation as a mildly astringent application for catarrh of the conjunctiva and similar conditions. Its composition is as follows :—

| | Grains per Gallon. | Parts per Thousand. |
|-----------------------------------|-----------------------|------------------------|
| Proto-carbonate of Iron | 3·36 | ·048 |
| Alumina | 1·18 | ·017 |
| Sulphate of Manganese | traces | |
| Silica | 1·22 | ·0174 |
| Sulphate of Calcium | 9·11 | ·1301 |
| „ Magnesia | 4·90 | ·07 |
| Carbonate of Magnesia | 1·98 | ·025 |
| Sulphate of Potash | traces | |
| Chloride of Potassium | 1·40 | ·020 |
| „ Sodium | 2·10 | ·030 |
| Sulphate of Soda | 1·89 | ·027 |
| Organic Matter, etc. | 0·36 | ·0051 |
| Total solids | 27·50 | ·3926 |

(R. WRIGHT, 1904.)

The special features of the Buxton treatment are :—

(1) *The Swimming Bath*.—The principal one is 30 by 16½ by 4½ feet deep, and contains 230,000 litres of running water. It is situated directly over the two principal springs, and about two million litres of water flow through the bath in the course



GOYTE VALLEY, BUXTON.

[To face p. 38.]

of 24 hours. The bather is thus enabled to come in contact with the constantly renewed activities of the water as it emerges in its natural state from the earth.

(2) *Douche Immersion Baths*.—These are of two kinds: the natural, which are of the same character as the swimming baths and contain about 900 to 1,000 litres of running water, and the warm, which are somewhat smaller. In these, ascending, undercurrent, and vapour douches are administered.

(3) *Buxton Douche-Massage*.—The patient reclines in a nickel-plated copper dish, the body half covered by the mineral water. Massage is given by a skilled operator, who carries a hose-pipe over his shoulder and douches that part of the body which he is massaging. The advantage of this method is that the muscles are in a fully relaxed condition, instead of being contracted and tense as when—in the Aix system, for instance—the patient sits or reclines on a hard bench.

(4) *Combined Vapour and Immersion*.—This constitutes a valuable form of treatment for sciatica and various arthritic conditions. The patient sits in a closed box reaching to the waist or neck. Into this box are forced gases or steam, obtained by heating the water. Thus the vapour possesses all the contained gases and radium emanations of the natural Buxton water. A complete immersion in the douche immersion bath follows.

(5) *Moor Baths and Packs* are extensively used. They are prepared by the admixture with the thermal radio-active water or with the chalybeate, as may be prescribed, of peat from the adjacent moors, rich in vegetable acids.

(6) *Chalybeate Baths*.—These are given as at Schwalbach, and are still or effervescing, as may be ordered.

Recreations.—The spa provides ample opportunities for recreation. The Pavilion gardens, which cover an area of 23 acres, practically adjoin the bathing establishments and contain a number of croquet lawns, tennis courts (the venue of the All England Ladies' doubles), both grass and gravel, and bowling greens, one of which is reputed to date back to the days of Queen Elizabeth; as well as an open-air rink used for roller skating in summer and curling in winter. The Pavilion is a miniature Crystal Palace, comprising conservatories and a spacious concert hall, capable of accommodating over 2,000

people. In this hall a band plays in the morning and evening if the weather is unfavourable for outdoor promenades, and from time to time concerts are given for which leading popular artistes are engaged. Buxton also has a handsome opera house and a variety theatre. There is an eighteen-hole golf course on Fairfield Common, within fifteen minutes' and a nine-hole course within five minutes' walk of the centre of the town. The moors in the neighbourhood provide grouse shooting, while fishing may be enjoyed in the waters of the Wye and the Dove. Enjoyable coaching trips are run in the summer months to several of the famous places within easy reach of the spa, including Haddon Hall and Chatsworth House, the Derbyshire seat of the Dukes of Devonshire. Buxton is also an ideal centre from which to visit the beautiful Derbyshire dales, and the motorist will find excellent roads and attractive scenery throughout the surrounding country. Abundant relaxation and amusement are thus provided for relatives and friends of invalids sharing their stay in Buxton.

Accommodation.—There are a large number of hotels and hydros, at which arrangements are made for any special diet or treatment that may be necessary. Within a few minutes' walk of the baths numerous comfortable apartment and boarding houses may also be found, and at these excellent accommodation can be obtained at the inclusive cost of 35s. to 50s. a week.

Buxton as a Resort for Foreign Invalids.—The best months at Buxton for foreign invalids are June, July and August. In June the climate is more bracing than that of any spa in central Europe situated at an altitude of less than 4,000 feet, while in July and August it is more bracing than that of the Continental spas south of Scandinavia, and perhaps more bracing than any other in England.

Contributed by a Committee of the Buxton Medical Society.

Buxton, Derbyshire. Population, 12,000. Height above sea-level, 1,000 to 1,200 feet. Open all the year. Chief season, May to September. Mean annual sunshine, 1475·8 hours (7 years). Mean annual rainfall, 44·5 inches (7 years). Mean Temperature : January, 35·6°; February, 36·7°; March, 39·7°; April, 42·5°; May, 47·2°; June, 53·2°; July, 57°;

August, $56\cdot8^{\circ}$; September, 53° ; October, $45\cdot4^{\circ}$; November, $39\cdot8^{\circ}$; December, 36° .

Distance from London, 160 miles. Time of journey, $3\frac{1}{2}$ to 4 hours.

For general information apply to the Information Bureau.

Hotels.—St. Ann's Hotel; Empire Hotel; Palace Hotel; George Hotel.

Hydro Hotels.—Peak Hydro Hotel; Buxton Hydro Hotel.

CHELTENHAM.

CHELTENHAM is included in this volume, less on account of any importance that can at present be claimed for it as a professional health resort, than because of the great potentialities which, although they are allowed to lie dormant, it undoubtedly possesses. Projects for the installation of a bath establishment are from time to time mooted. It would, then, be regrettable to retard such developments even in as far as complete omission here might have that effect.

Transformed originally by the fame of its mineral waters from an obscure hamlet into a flourishing town, Cheltenham has subsequently so far and so long neglected its springs in favour of other sources of prosperity, that it has now practically ceased to count as a spa, in the modern sense of that term. Yet, that a town endowed with mineral waters may achieve a very high degree of prosperity by turning that gift to account, without detriment to a simultaneous development of residential amenities and educational institutions, we have only to call Wiesbaden to witness. There, such a policy has resulted in a city of 100,000 inhabitants, with a visitors' list of 150,000, and buildings unrivalled in many a metropolis.

Over the great German spa, Cheltenham has an initial advantage in its relatively cool summers and mild winters; while in situation, surrounding scenery and mineral springs it possesses natural attractions beyond the common. The town is well laid out. Among other features, it has an avenue reminiscent of those so much admired by British visitors at foreign spas; while it is better off for music and some other attractions than most English provincial towns. Cheltenham, then, already has most of the advantages considered necessary at a modern spa; the hydrological resources alone require further development.

Mineral Waters.—There are waters of three kinds. One of them (an alkaline spring) not only is unrepresented elsewhere

in the United Kingdom, but is considered by some authorities as likely to be of greater value than any other natural mineral water we have. The present writer has been unable to find adequate clinical records of their action. In default of them, since medical hydrologists are agreed that from chemical composition alone clinical indications cannot safely be inferred, analyses are here omitted.

A. G.

CHURCH STRETTON.

CHURCH STRETTON—the old Roman “Street-town”—lies in the midst of the hilly country of south Shropshire, and is thirteen miles from Shrewsbury, fifty-three miles west of Birmingham, and seventy-six from Manchester. This pleasant upland climatic health resort nestles, amid varied scenery of notable beauty, in a wide, grassy valley, which is open to the north and south, but sheltered on the east by the Caradoc and Ragleth ranges of hills (1,505 and 1,300 feet, respectively); and on the west by the Longmynd (highest point, 1,696 feet). This last is a rugged and massive wall of uninhabited moorland, some ten miles long by five broad, indented here and there by heath-clad glens, or “batches,” the lonely hill-sides of which are the pasture lands of mountain sheep and native hill-ponies. The town lies on a natural watershed, well drained by a gentle slope northward into the Severn, and southward into its tributary, the Teme.

Climate.—The climate is decidedly tonic, and Stretton air, though definite description of it is difficult, has singular purity and invigorating freshness. There is no large town within fifty miles in the direction of the prevailing wind—the south-west. The cool hill breezes are sufficiently tempered by sea-borne moisture to exert a tranquillizing influence upon the nervous system. Fogs are rare, but occasionally there are hill mists. The winter climate is very bracing, but usually not severe. It is suitable for those in good general health, and for the more robust type of semi-invalid. There is a fair amount of sunshine, especially on the higher slopes of the hills, and always an abundant circulation of fresh air.

Temperature and Rainfall.—The mean daily maximum temperature is 51° F., while the mean night minimum temperature is 37° F. For a period of ten years, the average annual rainfall was 33 inches. March, May and September are usually the driest months; while the climate is most suit-



Photo by G. E. B. Church, Church Stretton.

CHURCH STRETTON, LOOKING WEST.

able for an open-air cure during May, June and onwards to the end of September.

Church Stretton has its negative features climatically, and is not in that respect a "cure-all" resort. For some invalids it is occasionally too windy, especially in winter, and sometimes, also, in early spring or late autumn. For others it is too rainy; and, to serve as a typical *station climatique*, it needs the provision of adequate open-air shelters.

Altitudes.—In the choice of a residence for invalids, the effect of altitude must be borne in mind, as this is an important factor in relation to certain types of chronic disease in elderly or greatly debilitated persons. Such, for example, are extensive cardiac valvular disease in patients with considerable ventricular dilatation and marked myocardial atony; advanced arterio-sclerosis, with persistently high blood pressure; some of the more severe forms of bronchial asthma, and extensive pulmonary emphysema.

That the open-air cure is Church Stretton's chief therapeutic asset, has been recognized by many writers. A paper read before the Royal Society of Medicine, calling attention to the many advantages of British health resorts for foreign invalids, places Church Stretton among the best of climatic stations in the British Isles: stations which its writer describes as "typically healthy in summer, and unsurpassed in the world in their possession of that ideal, air that is exhilarating yet by no means devoid of sedative qualities."

Indications for Open-air Cure.—This cure is indicated, *par excellence*, in most forms of neurasthenia and the functional neuroses; since the combined tonic and tranquillizing effect induces restfulness, mental calm and refreshing sleep. Convalescents from acute illness or severe operation; cases in which recovery is very slow and incomplete; anæmic patients with chronic granular kidney; the morbid neuro-dyspeptic; the neuro-arthritic; most middle-aged gouty, rheumatic, or "neuralgic" persons; the sufferer from obesity, needing regulated walking exercise with a dietetic régime; the sedentary brain worker; the compensated "heart case," and the neurotic woman, with vasomotor instability, as at the menopause—will all derive considerable benefit from a properly conducted open-air and rest cure at Church Stretton. For

children of a scrofulous diathesis, with a tendency to eczema, chronically enlarged glands, and, perhaps, chilblains; as well as for those born in India or anywhere in the tropics, and for those who have outgrown their strength, an annual summer visit to Stretton is indicated.

For the cachexia resulting from some chronic malarial or other blood-vitiating process; for the earlier stages of tubercular phthisis; for a moderate degree of chronic bronchial catarrh; for chronic gastric catarrh with non-obstructive dilatation; for atonic dyspepsia and functional hepatic inadequacy; for chronic skin diseases of diathetic origin; for the anæmia and chlorosis of delicate girls; for the general debility and amenorrhœa of young women who live in cities; for the albuminuria of adolescents, and lastly, for most middle-aged or elderly persons of active habits, the general effect of the summer climate is most beneficial.

After-cure.—For an “after-cure,” following a course of treatment at any of the British or Continental spas, Church Stretton is an ideal spot, where fine mountain air, pure water, sunshine, rest and recreation can be enjoyed in some of the finest scenery in England.

Mineral Springs.—Five miles to the south-west, across the moorland of the Longmynd, there are several valuable saline springs (Wentnor), the waters of which would have been “piped” ere now into a “Stretton Spa,” had this scene been laid in Germany, or perhaps even in France.

Recreations.—For outdoor recreation, there are first-class golf links (altitude 1,100 feet), and facilities for tennis, croquet, bowls, shooting, hunting, fishing, cycling and motoring; while the broad plateau of the Longmynd affords ample space for horse riding; and an abundance of walking exercise can be taken among the hills and valleys.

To Summarize.—Church Stretton has a fine bracing climate demanding heat production and tissue change; it has grand scenery, is easily reached by road or rail, and, when its natural advantages have been supplemented by some judicious town improvements, may look forward confidently to great future development.

Accommodation.—There are good hotels, and some excellent pensions, as well as many good private apartments and fur-

nished houses. During the season—from April to October—nearly every available room is taken, and intending visitors are strongly recommended to make early application for accommodation: especially at Easter, Whitsuntide, and during August and September.

NORMAN HAY FORBES, F.R.C.S. (Edin.).

Church Stretton, Shropshire. Population, 1,455. Height above sea-level, 630 to 820 feet. Annual rainfall (mean of ten years), 33 inches. Sunshine not recorded. Distance from London, 153 miles. Time of journey, 3¼ hours.

Hotels.—Longmynd Hotel; Sandford House Private Hotel.

CROWBOROUGH.

CROWBOROUGH is a hill resort, the scenic beauties of which have been aptly characterized as “the Highlands set in a Sussex framework.” It is 800 feet above sea-level, and extensive panoramic views unfold themselves from the summit of the hill, which claims the distinction of being the highest inhabited point of Sussex. The landscape is made up of valleys and hills richly beautified in form and colour, and stretches of heath-clad moorland alternating with clumps of gorse, woods and cultivated fields; while in the distance on a clear day a glimpse may be caught of the sea.

It is the local conviction that “there is no finer air than Crowborough air, and no more beautiful scenery,” and most visitors would probably be inclined to accept the enthusiasm of the phrase.

Climate.—A feature strongly in Crowborough’s favour as a health resort is its notable equability of temperature. This is well indicated by the following table, showing the mean daily range for the months of—

| | December. | January. | February. | Mean. |
|---------------|-----------|----------|-----------|-------|
| Penzance . | 5·2° | 5·4° | 5·3° | 5·3° |
| Ventnor . | 6·7° | 7·0° | 7·7° | 7·1° |
| Crowborough . | 7·2° | 8·3° | 8·3° | 8·0° |

This average of 8·0°, moreover, is only slightly exceeded by that for twenty-five years—namely, 8·4°.

It will be seen that in this respect Crowborough stands well to the fore among the health resorts of the United Kingdom. In consequence it may be conceded a special suitability for sufferers from diseases of the respiratory system—a suitability enhanced by the profusion of pine-growths in the neighbourhood.

In winter, although the air is often colder at Crowborough than in the valley below, ample compensation is found in the

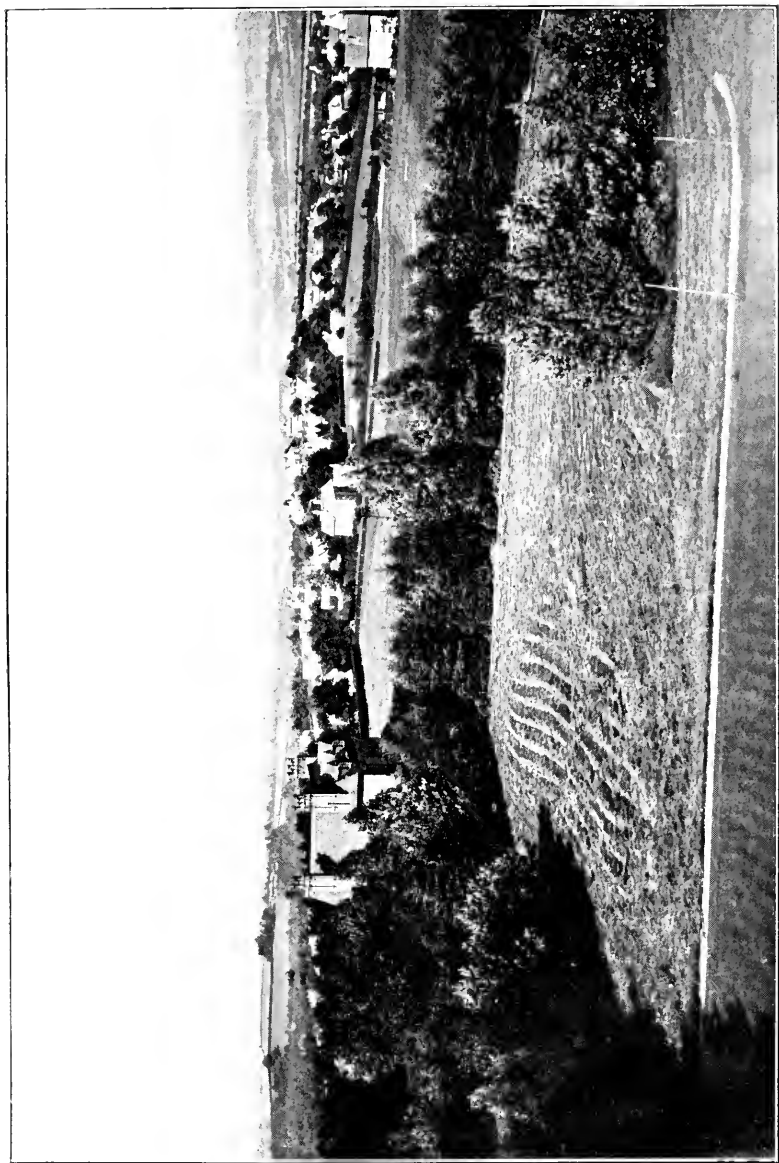


Photo by A. H. Stickells, Crowborough Cross.

CROWBOROUGH, VIEW FROM THE BEACON.

reversal of these conditions at night, when the temperature on the hill-top is relatively warm : frequently from ten to twelve degrees higher than in the valley.

The spring season is, with rare exceptions, dry ; the rainfall being heaviest during the autumn.

In summer the days are never oppressively hot, while the nights are cool and refreshing.

Crowborough may, then, be regarded as a climatic station of high rank, with a season lasting throughout the year.

The most prevalent wind is the south-west ; and the atmosphere, made stimulating and invigorating by the breezes from the Channel which sweep across the Downs, renders Crowborough peculiarly adapted for the treatment of diseases of the nervous system, whether organic or functional. It is an ideal place for a rest cure. An additional resource for the advantage of nervous invalids is a private establishment in which baths, electric treatment and vibratory massage are given. X-ray examinations are undertaken.

Recreations.—Crowborough is a very quiet place, but in summer there are flower shows and the usual outdoor events of the country, and there are excellent concerts from time to time.

For golfers there is a very good and easily accessible eighteen-hole course, with well-kept putting greens ; and several packs of hounds hunt the surrounding country. Quieter recreation may be found in exploring a district rich in historical interest, while the hedges and the woods will well repay the searches of the botanist.

At Crowborough there is accommodation of the first order.

H. S. B.

Crowborough, Sussex. Population, 5,500. Height above sea-level, 800 feet. Open throughout the year. Distance from London, 39 miles. Time of journey by train, 80 minutes ; but may be conveniently reached by motor-car.

Hotels.—The Beacon ; The Crest (private hotel).

It is a pleasure to be in the good old town of Droitwich. The Brine Baths Hotel is a fine building. There is a fine view of the town from the station. The Mineral Water is strong brine.

General Characteristics.—Droitwich lies in a long, wide valley, which is bounded on the north by the Lickey Hills, on the south by the Malverns, on the east by the Cotswolds, and on the west by the Habberley. The surrounding scenery is charming. From the high ground, which the undulating nature of the district makes easily accessible, a fine panorama is unfolded of the neighbouring country, with its broad expanse of woodland, interspersed with hop gardens and orchards.

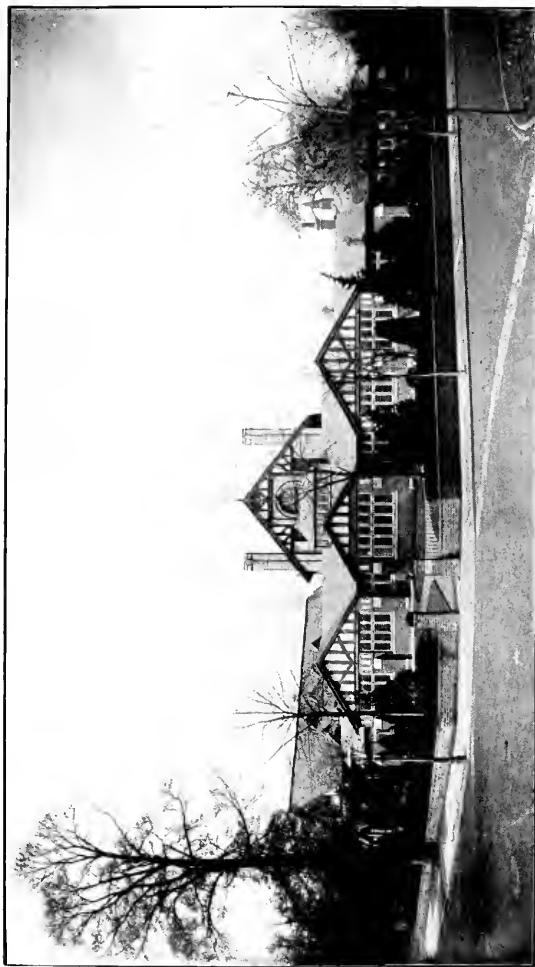
The visitor approaching Droitwich by rail from Birmingham may be excused if his first impression is unfavourable, as he sees the lower and unattractive part, to which the many chimneys of the salt works by no means add beauty. But on entering the town from the station he will find good roads and well-kept walks, planted with trees along the side; as well as many ancient buildings to evoke his interest.

Climate.—The climate is moderately bracing. There is an absence of fogs and mists, and the rainfall is less than in most parts of the Midlands, averaging about 22 inches annually.

The town is well protected from north and north-east winds, owing to the gentle undulations of the ground in its immediate neighbourhood, and to the luxuriant growth of trees.

History.—Droitwich has been celebrated since A.D. 816 for its brine, the therapeutic possibilities of which, however, were not recognized until 1852. At that time one of the salt works was being made use of as a cholera hospital. Ordinary water not being at hand, a cholera patient in a state of collapse was given a bath of hot brine. His skin became warm, his pulse returned, and he rapidly recovered. During the continuance of the epidemic, hot brine baths were used, with gratifying results.

Owing to the transference elsewhere of much of the salt industry, many of the salt pans have been removed, and works



DROITWICH, THE BRINE BATHS.

[To face p. 50.]

pulled down. Hence the town is assuming more and more the aspect of a health resort rather than, as formerly, of a manufacturing centre; and the time is probably not far distant when the brine will be used for therapeutic purposes only.

The Waters.—*Analysis of the brine.*

Specific gravity, 1·2129.

| | Grains per Gallon. | Parts per Thousand. |
|--------------------------|-----------------------|------------------------|
| Sodium Chloride . . . | 21517·13 | 307·387 |
| Magnesium Chloride . . | 350·49 | 5·007 |
| Sodium Bromide . . . | 18·48 | ·264 |
| „ Sulphate . . . | 870·10 | 12·434 |
| Calcium Sulphate . . . | 128·31 | 1·832 |
| Aluminium Sulphate . . | 38·15 | ·545 |
| Calcium Bicarbonate . . | 1·47 | ·021 |
| Iron Bicarbonate . . . | ·84 | ·012 |
| Silica | ·98 | ·014 |
| Ammonium Chloride . . . | ·28 | ·004 |
| Potassium Chloride . . . | traces | traces |
| Iodides | traces | traces |
| Total Salts | 22,926·23 | 327·517 |

The mineralization of Droitwich brine is, then, very exceptionally high.

The figure of 327 parts per thousand may be compared with those given for some of the strongest natural brines on the Continent: Bex, 311; Rheinfelden, 308; Biarritz-Biscous, 307; Salies-de-Béarn, 258; Salzungen, 265.

Bathing Establishments.—There are two bathing establishments—the St. Andrew's and the Royal Baths. The first are the more modern, and have recently been much improved and added to. At both establishments the baths are supplied with the same full density of brine, which is heated by steam to the required temperature. The installation at the St. Andrew's Baths includes private hot immersion, Aix-douche, douche, needle, vapour and Nauheim baths. There are also appliances for vaginal douches, the brine for their administration being diluted according to prescription. At the St. Andrew's establishment there are two fine swimming baths.

The Royal Baths were the first to be established at Droitwich. They provide immersion, douche, and swimming baths. The last are kept at a temperature of 90° F.

Brine swimming baths have in one respect a considerable advantage; the density of the water is so great that exercises, graduated according to the physical capacity of the patient, can be made use of. The bather, as well as standing or sitting in the water, can float so high out of it that he appears to be lying on it, as on a bed.

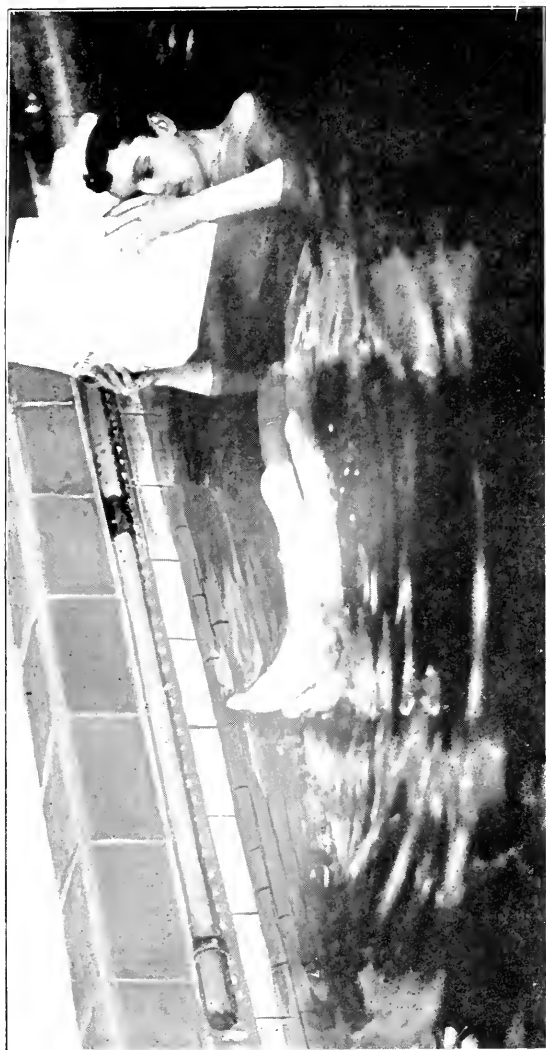
When lying in the water, the limbs are equally supported in every direction by the saturated brine; so that the patient is able to perform movements which he would not dare, on account of pain, to attempt otherwise. In the reclining baths, which are made of teak, wooden bats are placed across and over the patient, to keep him immersed. The usual period of immersion is from fifteen to twenty minutes, according to the temperature of the bath ordered. After it, in the dressing-room, the patient, wrapped in warm towels, takes a rest, which he may prolong at will in the reposefully furnished cooling-rooms.

Droitwich depends so entirely on the potency of its brine that the electrical appliances found at almost all other spas are not now used there. Some years ago, high frequency, radiant heat, and light baths were installed, but the results obtained were found not to justify their use. Experience has shown that the brine baths, in conjunction with properly applied massage, will accomplish all that is desired.

That the brine is radio-active has been known for some years, and its radio-activity may prove to be a factor of great therapeutic importance.

Indications.—The baths are peculiarly suitable during slow convalescence from acute articular rheumatism, even when it is associated with valvular affections of the heart. The chronic forms of rheumatism with swelling and stiffness of the joints, muscular rheumatism, fibrositis, sciatica, and the various forms of neuritis, are next in importance. In Graves's disease there has been noticed both diminution in the size of the gland, and reduction of the pulse rate.

Subsidiary indications are: Diseases of the skin; dry scaly eczema, psoriasis, hyperidrosis and bromidrosis; osteo-arthritis



[To face p. 52.]

DROTTWICH, BRINE SWIMMING BATH
(*To show the buoyancy of the brine*).

(especially when affecting the hip), rheumatoid arthritis, gonorrhœal and other forms of septic arthritis; and pelvic congestion. The results of the treatment in cases of chorea have been gratifying.

Internal Administration.—Internally, the brine is given diluted, one tablespoonful in a tumblerful of water. Acting both as a solvent of mucus in the stomach and as a liver stimulant, it is of use in gouty cases.

Recreations.—The kennels of the Worcestershire Hunt are three miles away, and the meet often takes place near Droitwich. There is a nine-hole golf course within ten minutes' walk of the middle of the town. In the summer the band plays daily in a small but well-kept park. At the Salters' Hall there is a reading-room, and a concert hall in which frequent concerts are given.

Accommodation.—There are very good hotels, private hotels, and apartment houses in the town.

Droitwich as a Resort for Foreign Invalids.—Droitwich has acquired a considerable reputation in America, and every year invalids are sent for treatment from various states of the Union. Comparatively few visitors, as yet, come from the Continent; but there is every reason to believe that when Continental physicians become aware of the extraordinary potency of the natural Droitwich brine they will recognize the advantage of sending patients for whom a strong revulsive action on the skin is indicated.

Contributed by a Committee of the Droitwich Medical Society.

Droitwich, Worcestershire. Population, 4,000.

Season. The baths are open all the year round. Chief season, from April to October.

Distance from London, 118 miles. Time of journey, 2 $\frac{3}{4}$ hours.

For general information apply to J. H. Hollyer, Spa Bureau, Droitwich.

Hotel.—Worcestershire Brine Baths Hotel.

Private Hotel.—Ayrshire House Boarding Establishment.

HARROGATE.

Mineral Waters : Muriated-sulphuretted ; Alkaline-sulphuretted ; Muriated ; Muriated-chalybeates ; Pure chalybeates.

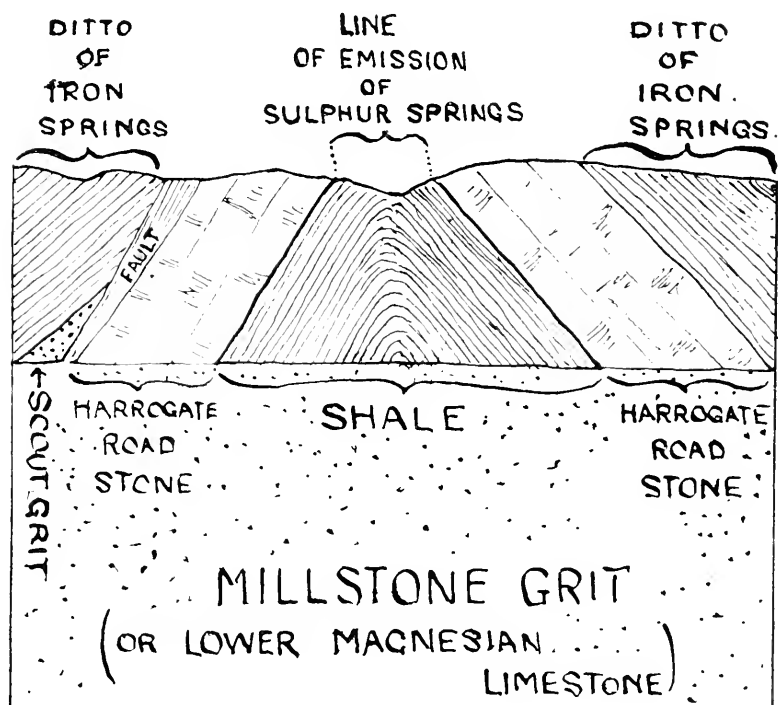
Situation and General Characteristics.—Situating upon a table-land, and so contrasting with other spas of European celebrity, Harrogate lies at an altitude of from 350 to 600 feet above the sea. Guarded by the Pennine Range (forty miles away) from north-west to south-west, it is sheltered from the vapour-laden winds of the Atlantic. These conditions have considerable influence in rendering the climate more dry and bracing than that of most English or foreign health resorts at similar or even higher elevations. Indeed, among the assets of Harrogate, its climate may be regarded as the chief and the most generally applicable. The greater part of the town is built round a series of open spaces, the largest of which, known as the “Stray,” is an expanse of common of over 200 acres. Other areas of land are free for public enjoyment, Harlow Moor being the most extensive.

Geology.—From this point of view, Harrogate is perhaps one of the most interesting places in Europe. The main well lies near the extreme end of a large geological upheaval. The crest of this ridge extends north-westerly to Clitheroe, in Lancashire, a distance of nearly forty miles. Along this line, the Shale formations, normally lying below the Carboniferous Limestone, have appeared on the surface, and, as the diagram shows, the strata in question have taken up positions nearly perpendicular to the original horizontal plane. To this fact is due the exceptional number of mineral springs—more than eighty in all—within a radius of two miles ; over thirty of them, in fact, within one small field (Bogs Field).

The Waters.—The simplest view as to the origin of the different springs is that they rise from a deep underlying body of water impregnated with salines (principally carbonates of the alkalies and alkaline earths). From this subterranean

HARROGATE

— SECTION — OF — STRATA —



ENLARGED (X2) FROM GEOLOGICAL SURVEY
OF ENGLAND AND WALES.

reservoir water comes to the surface between the nearly perpendicular strata, and when unaltered in condition, issues in such a spring as the Crescent Saline—a water almost identical in composition with that which made the reputation of Leamington in the middle of the last century. If, on the other hand, the saline water in its passage to the surface, meet with sulphides and common salt, it dissolves out these substances in varying amounts, and appears as one of the series of the Saline Sulphur Wells. The relative proportions of the salts held in solution vary greatly, and the waters of this type are classified by the contained percentages of common salt.

The principal members of the group are :—

Strong.—Old Sulphur Well. Strong Montpellier Sulphur Well.

Mild.—Mild Sulphur Well. Mild Montpellier Sulphur Well.

No. 36 Well. Magnesia Well.

Analyses of three springs typical of this group are as follows:—

| SOLIDS. | Old Sulphur Well, Royal Pump Room. | | New or Mild Sulphur, Royal Pump Room. | | Magnesia. | |
|-------------------------|---------------------------------------|-------------------------|--|-------------------------|---------------------------|-------------------------|
| | Grains per Gallon. | Parts per Thousand. | Grains per Gallon. | Parts per Thousand. | Grains per Gallon. | Parts per Thousand. |
| Sodium Sulphydrate . | 5·215 | ·075 | 6·89 | ·098 | — | — |
| „ Sulphide . | — | — | — | — | ·707 | ·010 |
| Barium Chloride . | 6·566 | ·099 | trace | trace | 1·222 | ·018 |
| Strontium Chloride . | trace | trace | — | — | trace | trace |
| Calcium Chloride . | 43·635 | ·623 | 16·70 | ·239 | — | — |
| Magnesium Chloride . | 48·281 | ·690 | 2·39 | ·034 | 1·792 | ·026 |
| Lithium Chloride . | ·753 | ·011 | trace | trace | trace | trace |
| Potassium Chloride . | 9·592 | ·137 | 11·34 | ·162 | 27·913 | ·399 |
| Ammonium Chloride . | 1·031 | ·015 | — | — | trace | trace |
| Sodium Chloride . | 893·670 | 12·767 | 582·95 | 8·328 | 215·896 | 3·084 |
| Magnesium Bromide . | 2·283 | ·033 | — | — | trace | trace |
| „ Iodide . | ·113 | ·002 | — | — | trace | trace |
| Calcium Carbonate . | 29·768 | ·425 | — | — | 18·476 | ·264 |
| Magnesium Carbonate . | 5·953 | ·085 | — | — | 12·799 | ·183 |
| Silica | ·701 | ·010 | 2·40 | ·034 | 1·608 | ·023 |
| Total Solids . | 1017·561 | 14·972 | 654·87 | 8·895 | 280·413 | 4·007 |
| GASES. | Cu. inches per Gallon. | | Cu. inches per Gall. | | Cu. inches per Gallon. | |
| | Cu. cent. per Litre. | Cu. cent. per Litre. | Cu. cent. per Gall. | Cu. cent. per Litre. | Cu. cent. per Gallon. | Cu. cent. per Litre. |
| Sulphuretted Hydrogen . | 10·46 | 36·62 | 4·18 | 15·06 | — | — |
| Carbon Dioxide . . | 40·10 | 144·52 | 13·22 | 47·64 | 11·50 | 41·45 |
| Nitrogen | — | — | 2·01 | 7·24 | — | — |
| Total Gases . | 50·56 | 181·14 | 19·41 | 69·94 | 11·50 | 41·45 |

In 1905, Sir William Ramsay ascertained the presence of radio-activity in the waters of the Old Sulphur Well in considerable amount, taking into consideration the very large proportion of dissolved solids present in this water. Fresh quantitative estimations of this factor and of the general chemical constitution of the waters are now in progress and will shortly be published.

Again, if the saline water in its journey to the surface come in contact with iron-bearing strata, in addition to those containing common salt, it provides the valuable waters known as the Saline Iron (Chalybeate) group; the members of which vary in the amount of contained iron (ferrous carbonate), from the very dilute, to springs nearly as strong in iron as those of Langenschwalbach.

This group comprises as its principal members:—

The Kissingen Well. The Chloride of Iron Well.

Alexandra Well.

Analyses of two of these wells are:—

| SOLIDS. | Kissingen Well. | | Chloride of Iron Well. | |
|---------------------------|--------------------------|------------------------|--------------------------|------------------------|
| | Grains per Gallon. | Parts per Thousand. | Grains per Gallon. | Parts per Thousand. |
| Ferrous Chloride . . . | — | — | 13·213 | ·189 |
| „ Carbonate . . . | 9·590 | ·137 | 11·050 | ·158 |
| Barium Sulphate . . . | ·509 | ·007 | ·222 | ·003 |
| Potassium Chloride . . . | 21·425 | ·306 | 3·205 | ·046 |
| Sodium Chloride . . . | 674·598 | 9·637 | 277·561 | 3·965 |
| Ammonium Chloride . . . | ·439 | ·006 | ·406 | ·006 |
| Barium . . . | — | — | 5·204 | ·074 |
| Strontium Chloride . . . | ·887 | ·013 | ·624 | ·009 |
| Calcium Chloride . . . | 87·337 | 1·248 | 94·015 | 1·343 |
| Manganese Chloride . . . | — | — | ·971 | ·014 |
| Magnesium Chloride . . . | 65·391 | ·934 | 57·315 | ·819 |
| Bromides, Fluorides . . . | traces | trace | traces | trace |
| Barium Carbonate . . . | 2·136 | ·031 | — | — |
| Calcium Carbonate . . . | 8·858 | ·127 | — | — |
| Silica . . . | 3·570 | ·051 | 1·414 | ·020 |
| Total Solids . . . | 874·740 | 12·497 | 465·200 | 6·646 |
| GASES. | | | | |
| | Cubic inches per Gallon. | Cubic cent. per Litre. | Cubic inches per Gallon. | Cubic cent. per Litre. |
| Carbon Dioxide . . . | 21·3 | 76·77 | 53·55 | 192·99 |
| Oxygen . . . | 1·5 | 5·41 | — | — |
| Nitrogen . . . | 5·2 | 18·74 | — | — |
| Total Gases . . . | 28·3 | 100·92 | 53·55 | 192·99 |

Further, in certain wells very little salt enters into the constitution of the waters, and two very valuable sub-classes are thus formed:—

(1) The sub-class of the alkaline sulphurs, in which the carbonates of the alkaline earths predominate. This includes the following Springs:—

- i. Beckwith.
- ii. Starbeck.
- iii. Harlow Car.

Analysis of the Starbeck Well is appended.

| SOLIDS. | STARBECK SPA. | |
|---------------------------------|--------------------------|------------------------------|
| | Grains per Gallon. | Parts per Thousand. |
| Sodium Sulphide | 1·515 | ·022 |
| Barium Chloride | trace | trace |
| Lithium Chloride | ·070 | ·001 |
| „ Chloride | trace | trace |
| Ammonium Carbonate | ·225 | ·003 |
| Sodium Chloride | 109·890 | 1·570 |
| „ Silicate | 2·073 | ·030 |
| Magnesium Bromide | trace | trace |
| „ Iodide | trace | trace |
| Calcium Carbonate | 7·825 | ·112 |
| Magnesium Carbonate | 4·119 | ·059 |
| Ferrous Carbonate | ·072 | ·001 |
| Potassium Carbonate | 1·745 | ·025 |
| Sodium Carbonate | 17·104 | ·244 |
| „ Iodide | ·001 | trace |
| Barium Carbonate | 2·275 | ·033 |
| Strontium Carbonate | ·141 | ·002 |
| Calcium Sulphate | 1·88 | ·027 |
| Silica | 3·27 | ·047 |
| Total Solids | 151·59 | 2·176 |
| GASES. | | |
| | Cubic inches per Gallon. | Cubic centimetres per Litre. |
| Sulphuretted Hydrogen | 1·78 | 6·42 |
| Carbon Dioxide. | 2·71 | 9·77 |
| Nitrogen | 6·34 | 22·85 |
| Total Gases | 10·83 | 39·04 |

(2) The class called Pure Chalybeates, in which ferrous carbonate replaces the sulphides of the last sub-class. These consist of:—

- i. The Tewit Well.
- ii. The Pure Chalybeate Well.

Analysis :—

| SOLIDS. | Tewit Well. | | Pure Chalybeate Well. | |
|---------------------------|--------------------------|------------------------------|--------------------------|------------------------------|
| | Grains per Gallon. | Parts per Thousand. | Grains per Gallon. | Parts per Thousand. |
| Ferrous Carbonate . . . | 1·358 | ·019 | 1·364 | ·020 |
| Calcium Sulphate . . . | ·697 | ·010 | ·740 | ·011 |
| Potassium Chloride . . . | 1·323 | ·019 | — | — |
| Sodium Chloride . . . | ·280 | ·004 | 1·625 | ·023 |
| Ammonium Chloride . . . | trace | trace | trace | trace |
| Manganese Chloride . . . | trace | trace | trace | trace |
| Bromides, Fluorides . . . | traces | traces | traces | traces |
| Calcium Carbonate . . . | 1·435 | ·021 | 1·532 | ·022 |
| Magnesium Carbonate . . . | 2·667 | ·038 | 1·952 | ·028 |
| Potassium Carbonate . . . | 1·057 | ·015 | ·262 | ·004 |
| Sodium Carbonate . . . | — | — | 1·103 | ·016 |
| Silica . . . | 1·041 | ·015 | ·502 | ·007 |
| Organic Matter . . . | ·063 | ·001 | ·750 | ·011 |
| Total Solids. . . | 10·521 | ·142 | 9·839 | ·142 |
| GASES. | Cubic inches per Gallon. | Cubic centimetres per Litre. | Cubic inches per Gallon. | Cubic centimetres per Litre. |
| | | | | |
| Carbon Dioxide . . . | 11·85 | 42·71 | 13·74 | 49·52 |
| Oxygen . . . | ·40 | 1·44 | ·82 | 2·96 |
| Nitrogen . . . | 5·33 | 19·21 | 8·00 | 28·83 |
| Total Gases . . . | 17·58 | 63·36 | 22·56 | 81·31 |

There is one remarkable constituent in some of the Harrogate waters : that is, barium, presumably as a chloride. It is well known that barium has a great effect in raising the arterial blood pressure, and the opinion is strongly held that the compounds of that element contained in the waters have a definite therapeutic value, preventing the depression often caused by courses of sulphur waters in which it is not present.

PHARMACOLOGICAL AND THERAPEUTIC DATA.

Saline Sulphurs.—These may be most conveniently considered with reference to the relative amount of contained salts. The Strong Sulphur and the Strong Montpellier are hypertonic as compared with the blood content of sodium chloride, and cause a flushing of the alimentary canal. Thus the first action observed is, after an hour or so, one or two perfectly painless, partially solid or quite fluid motions of the

bowel, of much greater than the normal bulk and weight ; with a resulting sense of well-being.

For many years independent observers have experimented with a view to determining the pharmacological action of these waters. The Old Sulphur Water—first in importance—has been the subject of investigation by the most approved chemical methods. In a recent series of experiments, the latest modern procedures have been used on both normal and pathological subjects, under fixed conditions of diet and exercise. Observations have also been made on animals, as to the effect of this water on the liver, and on the flow of bile. As the outcome of all this work the following facts may be stated as proved :—

1. Diuresis, 40 per cent. in amount and positive in type (110 per cent. in gouty cases).

2. An increase in volume and weight of fæces, amounting to nearly 250 per cent. (Much of the dose of the Strong Sulphur Water is undoubtedly voided by the bowel.)

3. An increase in general metabolism is shown by the rise in excretion of total nitrogen, amounting on the average to 7 per cent.

4. A 10 per cent. rise in the excretion of endogenous kreatinin is indicative, certainly of increased general metabolism, and possibly also of additional hepatic and muscle tissue change.

5. An increase in the metabolism of the nuclear elements of the body shown by the average increase of 10 per cent. in the uric acid arising from the body tissues (endogenous).

6. An increase in the percentage excretion of hypoxanthin (oxidized to uric acid and excreted as such) from the normal 45 per cent. to nearly 80 per cent., showing a stimulation of the xanthin oxidase.

7. A marked increase in the excretion of bile and bile solids.

The stimulating effect of this water upon general metabolism should be noted, especially as permitting the treatment of metabolic disorders and affections of the alimentary tract ; in many cases without the limitations of diet practised elsewhere.

Clinical experience confirms the above results, both as to

the effects on the general metabolism and on the hepatic functions.

Magnesia Water.—The general diuretic effect of the saline sulphur waters is most pronounced in this member of the series. In some albuminuria cases, due to gout or alcoholism, albumen is notably diminished during and subsequent to its administration. In glycosuria a diminution, less marked, in the excretion of sugar is observed.

These effects are worthy of consideration, not only in gout, but also in that large class of cases—the auto-intoxications—so many of which drift, first from physician to physician, and then from spa to spa.

The Saline Iron Springs.—Experiments on healthy subjects have shown that the hæmoglobin value of the corpuscle is increased both during and after the administration of these waters. The success with which they are given as invigorating agents after treatment by one of the sulphur salines is well known at Harrogate.

The excretion of urea is also increased.

Asthenic gout, rheumatoid arthritis, chronic nephritis, chlorosis, and other curable forms of anæmia, benefit greatly by a course of these waters.

Sub-Group 1:—

The Alkaline Sulphurs.—Taken by the mouth, these exercise little or no action on the bowel, as might be expected from their hypotonic state as compared with *liquor sanguinis*. The remark also applies, though in a less degree, to the mild sulphur waters of the Saline Sulphur group. All waters of this class, indeed, tend to produce constipation, and are used in various cases of mucous diarrhœa and tropical dysentery of a chronic type. Later stages of the treatment include regulation by the hypertonic saline sulphurs and the saline iron waters.

The waters under consideration, however, are chiefly used for bathing purposes, especially in various forms of hyperæmia of the skin. They allay itching and irritation, and the salts, mainly deliquescent, keep the superficial layers of epidermis in a permanently moist condition, and have a mild antiseptic action.



HARROGATE, THE ROYAL BATHS.

Sub-Group 2:—

The Pure Chalybeates.—The use of these springs will be obvious to every physician. It is, however, necessary to note that the weakness of such a spring as the Tewit ($1\frac{1}{2}$ grains of ferrous carbonate per gallon) is one of its main recommendations; for this water (especially when aerated) is well borne by cases in which there is difficulty in the administration of the ordinary pharmacopœial preparations of iron.

Baths and Bathing Establishments.—For the efficient employment of these numerous mineral waters, the Harrogate Corporation have spent a vast sum in the provision of bathing establishments. At these are given the local sulphur water baths in their various forms: baths upon the efficacy of which the reputation of Harrogate has in the main been built; but the outstanding feature of the establishments is that there has been installed in them virtually every approved appliance for balneological treatment.

i. *The Royal Baths* are furnished with all modern appliances, and capable of giving some 1,500 treatments a day. At the height of the season the number given is, on an average, 1,100 daily; while the total for one year is no less than 150,000.

ii. *The Victoria Baths.*—An older installation, at which the prices are slightly lower than at the Royal. At the height of the season some baths can be taken to greater advantage here; while there are others which are not obtainable in the larger establishment.

iii. *The Starbeck Baths*—where alkaline sulphur water can be used at the source.

The forms of treatment obtainable are so numerous and varied as to render classification a matter of some difficulty.

They may be roughly divided into *general* and *local*, an arrangement necessarily imperfect, for many of them are used in both ways.

General Baths.—These may be divided into two groups:—

- i. Those treatments depending on the application of some chemical material.
- ii. Those involving the use of some form of physical energy.

Sub-Section 1:—

1. **Sulphur Baths.**—Three varieties of sulphur water are used:—

- (1) Saline Sulphur (the mixed product of many wells).
- (2) The Beckwith water (a single source) alkaline sulphur.
- (3) The Starbeck water, whose distinguishing characteristic is the excess of carbonates, alike over common salt and the sulphides.

THERAPEUTIC NOTES.

As with all thermal baths, their action is principally through the vasomotor system, the saline sulphurs having in addition a stimulating effect on the skin, while those waters poor in sodium chloride have, as already noted, a very valuable sedative effect.

2. **The Peat (or Moor) Baths.**—The ferruginous peat of the neighbouring moors, containing free peaty acids, is exposed, mixed and ground to the requisite degree of fineness, and is used in four different ways:—

- (a) With plain water.
- (b) Modified in action by mixing mineral waters of various kinds.
- (c) Mixed with brine.
- (d) In conjunction with the constant electric current.

THERAPEUTIC NOTES.

The peat or moor bath has the effect of a poultice over the whole body, but greatly heightened in degree, as the peat remains at a nearly uniform temperature during the whole period of immersion. The support given to the body by a compound of high specific gravity, favours muscular relaxation and acts as a general sedative to the nervous system. Another noteworthy feature is the agreeable effect upon the skin.

3. **Carbonic Acid Baths.**—These are given in various strengths, sometimes in combination with the special Swedish medical gymnastic exercises commonly known as Schott's. There are no natural springs at Harrogate containing sufficient carbonic acid gas, so that the sulphur waters are artificially

impregnated—a course followed even at Carlsbad, where there is an abundant supply of water rich in CO_2 . It is now generally agreed that the artificially impregnated water is quite as efficacious as that naturally charged.

4. **Brine Baths.**—The brine is imported from near Middlesbrough, and used in a concentrated form, or diluted with any of the varieties of sulphur water. The proportion of sodium chloride in a brine bath is about ten times that in an ordinary saline sulphur bath. This brine may be used to intensify the Nauheim and other baths.

5. **Pine Baths.**—The aromatic and resinous qualities of the pine are combined with one or other of the sulphur waters.

6. **Iron Baths.**—Baths of chalybeate water impregnated with carbonic acid gas.

Sub-Section 2.—Baths depending on physical agents :—

1. **Massage.**

- i. Harrogate douche-massage.
- ii. Vichy douche-massage.
- iii. Needle douche.
- iv. Scotch douche.

THERAPEUTIC NOTES.

Harrogate douche-massage and Vichy douche-massage.

These baths depend for their effects upon the heat and the character of the flow of water; on the kind of massage employed and, lastly, on the posture of the patient.

By changing any one of these factors, the general effects upon the vasomotor system can be varied, and the blood pressure raised or lowered to suit the requirements of individual cases. The surface vessels become engorged, and so relieve any tendency to stasis in the deeper organs; whilst ultimately the general circulation is stimulated.

2. **Heat (air and vapour).**

- i. Turkish baths.
- ii. Dowsing radiant heat and light bath.
- iii. Greville electric hot-air bath.
- iv. Combined light and heat treatment.
- v. Russian vapour.
- vi. Berthe medicated vapour bath.

THERAPEUTIC NOTES.

All these are administered by trained attendants, and the usual therapeutic results can be predicted with confidence.

3. Electricity.

- i. Electric immersion bath (constant, interrupted or sinusoidal currents). This bath can be given with sulphur or plain water.

THERAPEUTIC NOTES.

Besides a general cataphoretic effect when the constant current is utilized, this bath is of considerable use in many cases of debility and neurasthenia.

- ii. Electric light and ozone bath.
- iii. D'Arsonval high frequency.
- iv. Static machine.

THERAPEUTIC NOTES.

These methods have their definite position and therapy, and need no comment. The machines are kept in order by skilled electricians.

LOCAL BATHS.

Many of the above measures can be applied locally, especially air heated by electric radiation, and various forms of douche, such as the sitz and ascending douches.

Berthollet Bath.—A very successful method of applying heat and moisture to most of the joints of the extremities. It may be combined with local massage and passive movements of the affected parts.

Intestinal Lavage.—Of local treatments undertaken during recent years at the Royal Baths which have met with marked success, the system of intestinal lavage, with the combined bath and under-water douche, stands out conspicuously.

THERAPEUTIC NOTES.

The treatment is principally applicable to cases of mucous colitis, faecal anæmia, constipation and intestinal atony. Those familiar with the various appliances for the administration of this treatment will recognize that the installation

leaves nothing to be desired; and patients will appreciate the advantage of being attended by trained male and female nurses. The waters used are peculiarly suitable, owing to the sedative nature of their action on the intestinal mucous membrane.

Cataphoresis, or instillation of ions in a nascent condition by means of a constant electric current, has also become a feature of some importance in bath treatment, especially in gouty, rheumatic and rheumatoid affections of joints, muscles and fasciæ. (Leduc's and Schnee's systems are both in operation.)

Ems System, for Local Treatment of the Upper Air Passage.—This system has recently been organized with considerable success. The apparatus for the fractionization of the water is of the most recent design, and ample precautions are taken to prevent any possible source of infection. Contagious affections are not treated in this department. A physician's prescription is necessary before the commencement or the resumption of treatment. Sedative or astringent effects can be produced, according to the character of the mineral water used. Medicated inhalations are also undertaken.

Massage and Mechanical Exercises.—Dry massage (Swedish and English), and Swedish medical gymnastics, mechanical exercises, and mechanical massage, are now undertaken by specially selected masseurs. This department has recently been enlarged and reorganized on entirely new lines, and arrangements have been made for patients to be attended at their own residences.

Inunction, as at Aachen, is also provided, under special regulations.

Indications.—General indications and counter-indications only can be given. The following classes of cases are treated with benefit at Harrogate :—

1. Gout and other metabolic disorders (glycosuria and obesity).
2. Functional liver derangement and early cases of cirrhosis; cholelithiasis and cholecystitis.
3. Chronic skin diseases of all kinds.
4. Sciatica and other forms of neuritis, muscular rheumatism and fibrositis.
5. Arthritis (rheumatoid, chronic rheumatic, and toxæmic varieties).

6. Mucous colitis, chronic dysentery, constipation and intestinal toxæmias.

7. Anæmia in its various forms.

8. Functional nervous diseases (neurasthenia and hysteria).

9. High blood pressure (especially early stages).

10. Sequelæ of various tropical diseases.

11. Plumbism and chronic toxæmias.

Patients who are liable to bronchial trouble, and those suffering from advanced arterio-sclerosis or chronic nephritis, should delay a visit until the warmer months.

Contra-Indications.—Sufferers from grave disease of the kidneys, heart or lungs should not be sent to Harrogate.

The Royal Bath Hospital is referred to elsewhere in this volume.

Season for Visit.—The main season is from May to October, inclusive; but the Hotels, Baths and Wells are open the whole year round.

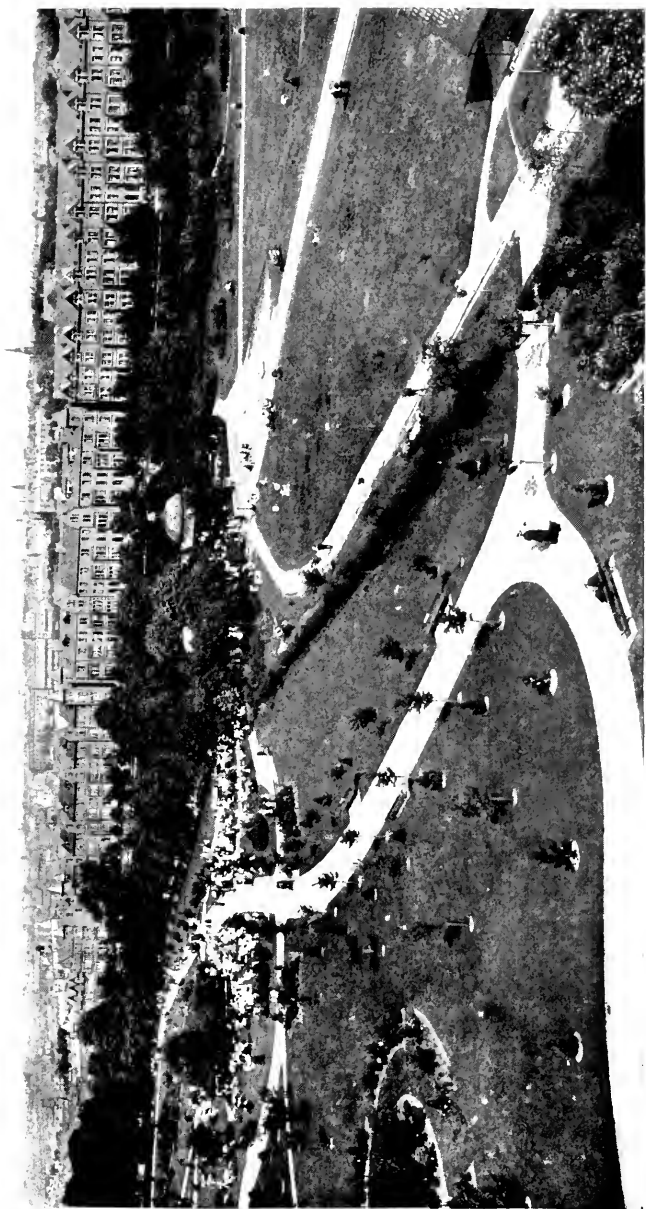
The winter season prices for the Baths are 25 per cent. to 33 per cent. lower than during the summer months.

Attention may be drawn to the fact that neither "cure-tax" nor music-tax is demanded of visitors; thus there are no spa expenses for those not taking the cure.

Length of Visit.—A period of three—preferably four—weeks is advised for the cure, except in cases of profound debility, neurasthenia, or where some special condition demands a longer visit.

That Harrogate, with its pure moorland air, is suitable for a prolonged stay, is evidenced by its fifty or more boarding-schools; parents finding the climatic conditions, both in summer and winter, favourable to the health and growth of even very delicate and backward children.

Harrogate as a Spa for Foreign Invalids.—It should be pointed out to our foreign colleagues that the remarkable variety of mineral waters possessed by Harrogate, as well as the numerous appliances for treatment both physical and balneary, give the spa a correspondingly wide range of indications. These indications, from the point of view of balneo- or of physiotherapy, are the same for invalids of all nationalities. Hence, in selecting patients for treatment at Harrogate foreign physicians will probably first consider how the climatic conditions differ from those at Continental resorts. Mean tem-



HARROGATE, PART OF THE VALLEY GARDENS.

[To face p. 66.]

peratures are appended to this article, though, as need scarcely be said, no set of figures can be taken as indicating the full effects of climate upon invalids. During that part of the chief bathing season from June to September, Harrogate is more bracing than any spa in France or Germany. In this respect the situation of the town upon an open plateau renders the contrast from mid-July to mid-August so marked that comparison with any other European spa is hardly possible.

Harrogate, then, may be selected for any foreign invalid for whom any of its treatments are indicated, and especially for those whose treatment can be most advantageously carried out in an air which is essentially stimulating.

Amusements.—The Kursaal (indisputably the finest building of its kind in the United Kingdom, and built at a cost of nearly £70,000), is used thrice daily by the Municipal Orchestra (40 or more performers) under the direction of Mr. Julian Clifford.

Cinematograph shows and vocal and variety items have also a place in the programme. A weekly Symphony Concert is given during the season.

The Opera House provides theatrical, operatic and variety programmes of the highest class throughout the year.

Sport—

Golf.—Two clubs.

Cricket.—The local club welcomes visitors, and County matches are from time to time played upon the ground.

Tennis and Croquet.—The Dragon Club receives visitors.

Motoring.—The local Automobile Club makes frequent expeditions during the summer. Visitors who are members of recognized automobile clubs are welcomed.

Expeditions and Tours.—Owing to the very invigorating climate, visitors are apt at first to overdo the excursions; but during the latter part of the visit, which takes the place of the “after-cure” so common elsewhere, these expeditions may be undertaken by patients with great benefit. Among the places to be visited, the best known are York, Knaresborough, Ripon, and the ruined abbeys of Fountains, Rievaulx, Bolton, Byland and Kirkstall.

General Information Bureau.—A new department of the Royal Baths is the General Information Bureau. Here may be obtained all particulars regarding the waters and baths, sport, and amusements.

List of Baths, etc. :—

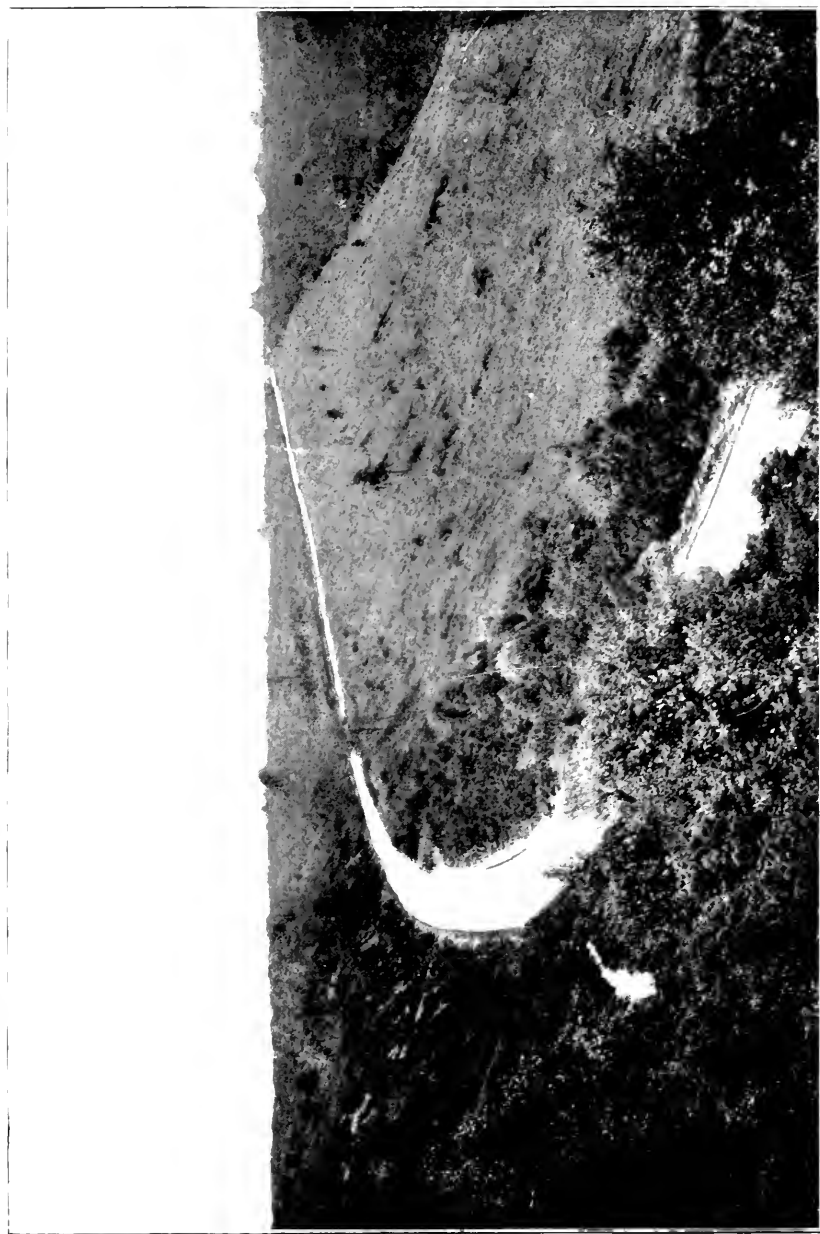
1. *Sulphur*.—Saline; Beckwith; Starbeck.
2. *Peat*.—Plain; with sulphur water; with brine; with electric current.
3. *Carbonic Acid*.—Plain; with sulphur water; with chalybeate water.
4. *Brine*.—Plain; with sulphur water.
5. *Pine*.—Plain; with sulphur water.
6. *Oxygen*.—Plain; with sulphur water.
7. *Douches and Massage Douches*.—Sulphur; Harrogate massage (Aix-les-Bains system); Vichy; needle; Scotch; special; ascendante.
8. *Intestinal Lavage*.—With or without Tivoli douche and immersion bath.
9. *Sitz*.—With still water; with running water.
10. *Packs*.—Liver pack; local peat pack.
11. *Turkish*.
12. *Vapour*.—Russian; Berthe; Berthollet.
13. *Radiant Heat*.—Combined light and heat; Greville; Dowsing; light and ozone.
14. *Electric*.—D'Arsonval high frequency; cataphoresis (Leduc's system; Schnee's system); Beckwith sulphur with constant, interrupted or sinusoidal current; Vibration treatment; Static machine.
15. *Massage*.—English and Swedish masseurs and masseuses.
16. Medical gymnastics (mechanical) and Swedish orthopedic exercises. Velotrab; rowing machine; symmetrian, etc.

Contributed by the Harrogate Medical Society.

Harrogate, Yorkshire. Population, 33,706 (1911). Height above sea-level, 350 to 600 feet. Open all the year round. Chief season from May to October. Mean annual rainfall, 29·65 inches. Mean temperatures : January, 36·9°; February, 37·7°; March, 40°; April, 44·1°; May, 49°; June, 55·4°; July, 58·7°; August, 57·9°; September, 54·1°; October, 47°; November, 41·7°; December, 37·4°.

Distance from London, 200 miles. Time of journey, 4 hours.

Hotels.—Crown Hotel; Grand Hotel; Prince of Wales Hotel; Queen Hotel.



Lent by the Footpaths and Commons Preservation Society.

HINDHEAD, PORTSMOUTH ROAD LOOKING TOWARDS GODALMING.

HINDHEAD; WITH GRAYSHOTT AND HASLEMERE.

THE claims of Hindhead as a health resort may be enumerated as pure, bracing moorland air; abundant sunshine, both in summer and winter, and glorious and diversified scenery.

It does not, indeed, offer many attractions for those whose conception of a resort for health and change includes the provision of miscellaneous entertainments, but it will not fail in its appeal to patients who are well content with the unspoiled beauty of nature. Valuable as it is, moreover, as a temporary health resort, Hindhead's attractions as a place of permanent residence are perhaps even greater.

Although barely forty miles from London, it has scenery which, with its hills and valleys on every side, irresistibly reminds one of parts of Scotland and Switzerland. The land is one of breezy commons, clad with gorse and heather, bracken and whortleberry; while here and there dark masses of Scotch fir add their sombre beauty to the landscape.

There is no "Hindhead" proper; that is, no town or village to which that name is confined. It is one which is applied indefinitely to the whole district on the top of the Hindhead range of hills, which forms so prominent a landmark on the south-western border of Surrey, where that county meets Sussex and Hampshire. The vagueness of its confines, and the haphazard way in which the houses and shops have been dotted about the neighbourhood, render it difficult to convey a clear idea of the place in a short space.

For the purposes of description it will be convenient to take as a starting-point the old coaching inn known as the "Royal Huts," situated on the London-Portsmouth Road, at the point where this road is crossed by the Farnham-Haslemere Road. Grouped round this inn are shops, bank and post office, and it forms the centre of traffic for the whole district. The principal hotels and boarding-houses are all situated within half a mile, on one or other of the main roads. Barely a mile away, on the Farnham Road, are the fine links of the Hindhead Golf Club (18 holes).

Leaving the "Royal Huts" and following the Portsmouth Road in the direction of London for about 300 yards, we come to the Hindhead Common, a splendid stretch of moorland, over 700 acres in extent, and rising at its highest point (Gibbet Hill) to 895 feet above sea-level. It commands an extensive view in every direction. The road passes just below Gibbet Hill, and makes a bold sweep round the deep combe, or valley, to the west, known as the "Devil's Punch Bowl."

The accompanying illustration, kindly lent by the Commons Preservation Society, shows the Portsmouth Road winding round the Devil's Punch Bowl, and Gibbet Hill above it, to the right.

Two miles to the south of the "Royal Huts," the Portsmouth Road traverses Bramshott Common, another fine stretch of open moorland, its north-western side adjoining Ludshott Common, from which it is separated by a series of small lakes, or ponds, known as Waggoners' Wells. The Wells are surrounded by thickly wooded slopes affording many beautiful walks, cool and shady in summer, and sheltered from the blustering winds of winter.

Indications.—The cases for which Hindhead is specially suitable are :—

1. Cases of tuberculosis in all its manifestations, and particularly pulmonary tuberculosis. The latter come to Hindhead in ever-increasing numbers, and as a rule do so well that a considerable proportion of them settle permanently in the district. The hotels and boarding-houses refuse cases of phthisis, but there is no difficulty in obtaining suitable furnished houses, and a certain number of lodgings are also available.

2. Neurasthenia. Rest-cures can be satisfactorily carried out in one or other of the nursing homes.

3. Convalescence from surgical operations or acute illness.

4. Neuritis. Massage, radiant heat baths and electrical treatment can be obtained at the nursing homes.

5. Asthma. Some cases derive great benefit from residence at Hindhead, while others do better at Haslemere.

6. People who have lived in the tropics, and who now winter abroad, derive benefit from spending the summer and autumn at Hindhead.

7. Delicate children. There are preparatory schools where special attention is given to delicate children.

Climatology.—The following figures are averages for the last ten years :—

Bright sunshine, 1,704 hours. Rainfall, 33 inches. Mean temperature, 48·35° F. Mean temperature, June–September inclusive, 57·5° F. Frost occurs in the screen on 66 nights.

Although the rainfall is somewhat high, yet, owing to the porous nature of the soil, the ground dries very rapidly and never gets sodden.

For temporary visitors, the best months are from the middle of April to the end of October. November and December are often fine, with abundant sunshine. January and February, as in most parts of England, are liable to be wet and cold. March is a very variable month, sometimes being brilliantly fine, while in other years snow and rain predominate.

Grayshott.—On the south-west slope of Hindhead, one mile from the “Royal Huts,” lies Grayshott (700 feet above sea-level), a picturesque village of 1,000 inhabitants. Sheltered as it is from the north and east by the lie of the land and by its numerous pine-woods, it is particularly suitable as an all-the-year-round residence for those who find the less wooded and more exposed heights of Hindhead rather trying in the winter months. Furnished houses provide the best accommodation for visitors to Grayshott, though there is a modest but comfortable inn, managed on the Gothenburg system.

Haslemere.—Three miles to the south-east of Hindhead, and lying in the valley between Hindhead and the Blackdown range (albeit a valley 500 feet above sea-level), is the ancient town of Haslemere, well known to artists and lovers of beautiful English scenery. It has 3,600 inhabitants. The wide High Street, with its picturesque houses and the Market House at its north end, gives an old-world look to the town; but, from a health point of view, it is thoroughly modern. Haslemere is essentially a residential town and does not cater for temporary visitors to the same extent as Hindhead. During the last twenty years the town has grown rapidly, the houses invading the slopes of the hills on every side, in accordance with the modern preference for high ground and extensive views. The higher parts of Haslemere have practically the same climate as Hindhead, and cases which do well at the latter place do equally well at the former.

A. L.

Hotel at Hindhead; Thirlestane Hotel.

LEAMINGTON.

Mineral Waters : Muriated and sulphated.

LEAMINGTON is a well-planned and attractively built town, occupying the adjacent slopes of two hills and the valley between them, through which runs the river Leam. The streets and avenues are wide and planted with trees. The public gardens, stretching from east to west in the centre of the town, form one of its most delightful features. In the Jephson Gardens, the Pump Room Gardens, the York Promenade and New River Walk there are to be found a succession of shady walks, green lawns and bright flower beds.

Leamington is well sheltered and protected from winds. That which prevails blows from the west. The climate is generally mild, equable and dry, the winters not severe, and the summers not excessively warm. The surrounding country is well cultivated and fertile. The soil, consisting of red sandstone and gravel, is porous and fairly dry.

Rainfall, Temperature, etc.—The average rainfall per annum for the last thirty years is 24·03 in. The average number of days per annum for the same period during which rain has fallen is 159. The mean maximum temperature during the last thirty years is 56·75° F., and the mean minimum 42·24° F.; while the mean atmospheric pressure is 29·87 in.

The Baths.—The Baths are controlled by the Town Council, and are situated centrally in the Pump Room Gardens, close to the Jephson Gardens, which make a suitable Kurgarten.

Classification of Baths and Appliances at the Pump Rooms.

1. **Thermal**, which depend solely on heat for their action :—

- (a) Plain hot-water baths; (b) the Turkish bath; (c) the vapour bath; (d) the hot-air bath, *e. g.* the Solarium and Dowsing bath; (e) the sitz bath,



[To face p. 72.]

LEAMINGTON, THE PARADE.

2. **Thermo-chemical**, which depend for their action on heat and some chemical constituent :—

- (a) Leamington saline baths; (b) Nauheim baths; (c) brine baths; (d) alkaline, sulphur and pine baths; (e) medicated vapour baths (mercurial, etc.), and (f) the liver pack.

3. **Mechanical or percussive**, in which the hot water or water of alternating temperature is applied with some mechanical apparatus, and with or without massage :—

- (a) Needle bath and douche; (b) the running sitz bath; (c) the Aix douche; (d) the Vichy douche; (e) the Turkish bath with massage; (f) the Scotch douche.

4. **Thermo-electrical**, in which heat and electricity are employed, either with plain water or with some chemical adjuvant :—

- (a) The galvanic bath; (b) the faradic bath; (c) the sinusoidal current bath; (d) the electro tannin bath.

5. **Electrical Bath**, in which electricity is the sole agent. High frequency :—

- (a) Auto-condensation; (b) effleuve.

6. **Ionic Medication** by cataphoresis.

7. **Vibration Massage**.

Therapeutic Action of the Leamington Waters, (a) taken internally; (b) used externally :—

A. (1) *Action on the stomach.*

The waters decrease the viscosity of the mucus in the stomach, cleanse its surface and prepare it for the digestive processes. It has been found clinically that in cases of gastric hyperacidity, by virtue of the sodium chloride the waters diminish the secretion of hydrochloric acid; while in cases of subacidity, they promote its secretion.

(2) *Action on the intestines.*

The waters are decidedly aperient and, producing a painless and watery evacuation, relieve portal congestion and promote the elimination of toxic substances; but whether this action is due to an induced endosmosis or to neuro-muscular stimulation has not as yet been determined.

(3) *Action on the kidney.*

The waters, when given in doses insufficient to produce a

purgative action, act as a strong diuretic and increase the amount of uric acid excreted.

B. The Leamington waters, when used externally as baths, have a much greater stimulant effect than fresh water baths at the same temperature. They produce a profuse diaphoresis and a prolonged cutaneous vaso-dilatation, with a corresponding central vaso-constriction and anæmia. When applied locally as douches, their stimulating properties reinforce the dynamic action and so promote the absorption of inflammatory exudations and adhesions.

The Saline Springs.—The waters are cold and of the muriated-sulphate variety. Their source is the saliferous marls which form part of the lower Keuper beds of the Red Sandstone upon which Leamington is built.

The following are the results of recent analyses of the waters by T. H. Byrom, F.I.C., F.C.S.

| | Pump Room Well No. 1. Strong. | Aylesford Well. | High Street Well. |
|-----------------------------------|-------------------------------------|--------------------|----------------------|
| GRAINS PER GALLON. | | | |
| Sodium Chloride . . . | 894.24 | 472.80 | 487.20 |
| „ Sulphate . . . | trace | 22.72 | trace |
| Calcium Sulphate . . . | 230.56 | 165.12 | 182.00 |
| Magnesium Chloride . . . | 60.96 | trace | 10.80 |
| „ Sulphate . . . | 38.40 | 69.12 | 55.44 |
| Calcium Carbonate . . . | nil | nil | nil |
| Total solids in grains per gallon | 1224.16 | 729.76 | 735.44 |
| PARTS PER THOUSAND. | | | |
| Sodium Chloride . . . | 12.77 | 6.75 | 6.96 |
| „ Sulphate . . . | trace | .32 | trace |
| Calcium Sulphate . . . | 3.29 | 2.35 | 2.60 |
| Magnesium Chloride . . . | .87 | trace | .15 |
| „ Sulphate . . . | .54 | .98 | .79 |
| Calcium Carbonate . . . | nil | nil | nil |
| Total solids in parts per 1,000 | 17.47 | 10.40 | 10.50 |

In the Pump Room water a very small amount of iron is present as the carbonate.

Diseases suitable for Treatment at Leamington.

1. **Diseases due to Faulty Metabolism:** (a) Gout and lithæmia; (b) diabetes and alimentary glycosuria; (c) obesity.

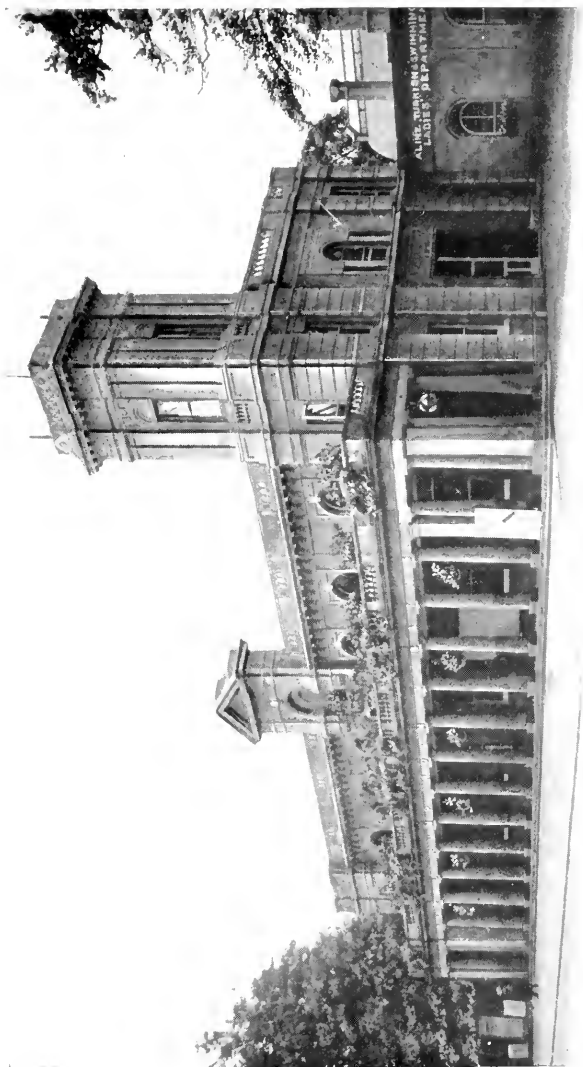


Photo by W. H. Smith, Leamington; Sagar & Co.

THE PUMP ROOM AND BATHS, LEAMINGTON.

2. **Diseases of the Alimentary System:** (*a*) Affections of the stomach: (1) gastric irritation with hyperacidity, (2) gastric insufficiency with subacidity or anacidity, (3) chronic gastric catarrh, (4) non-obstructive dilatation; (*b*) portal congestion and enlarged liver, especially due to residence in the tropics; (*c*) cholelithiasis; (*d*) mucous colitis; (*e*) hæmorrhoids; (*f*) chronic constipation.
 3. **Respiratory Diseases:** Chronic bronchial catarrh occurring in portal congestion.
 4. **Diseases of the Circulatory System:** (*a*) Early arteriosclerosis with high tension; (*b*) diseases of the heart with commencing failure of compensation.
 5. **Diseases of the Joints and their Envelopes:** (*a*) Gouty arthritis; (*b*) arthritis deformans and allied conditions; (*c*) adhesions and fixation of joints after fractures, dislocations and sprains.
 6. **Diseases of Muscles and Connective Tissue:** (*a*) Myositis or myalgia, especially lumbago; (*b*) strains; (*c*) fibrositis.
 7. **Diseases of the Nervous System:** (*a*) Neuritis, *e. g.* sciatica and facial paralysis; (*b*) neuralgia; (*c*) the results of hemiplegia, *e. g.* muscular weakness; (*d*) chronic anterior poliomyelitis; (*e*) the myopathies; (*f*) neurasthenia, in which sleeplessness, irritability and dyspepsia are prominent symptoms; (*g*) hysteria, especially the paralytic conditions.
 8. **Pelvic Congestion and Chronic Inflammation of the Uterus and Appendages.**
 9. **Skin Diseases:** especially (*a*) Gouty eczema; (*b*) psoriasis; (*c*) seborrhœic eczema; (*d*) chronic urticaria; (*e*) pruritus.
- Diseases Contra-indicated:** (1) All cases of failing heart and kidney disease accompanied with dropsy; (2) wasting diseases, such as phthisis; (3) cancer; (4) organic diseases of the stomach and intestines.

We thus see that Leamington, from its climate, baths and saline springs, is well suited to numerous classes of patients. The "cure" should last at least a month, and can be taken at any time, though the pleasantest period of the year is from

April to October. A strict daily regimen is enforced during the treatment.

Leamington as a Spa for Foreign Invalids.—Leamington shares with other English inland towns of moderate altitude a mild and equable climate—warmer in winter and cooler in summer than the health resorts of central Europe. Foreign physicians on studying the analyses appended to this article will recognize that the mineral waters are well suited for the treatment of the diseases mentioned in the list of indications, and they may rest assured that the balneary equipment is in every way adequate.

To foreigners, well or ailing, one of the chief attractions of a health resort is that both the town itself and its surroundings shall be thoroughly representative of all that is most characteristic of the country in which it is situated. In this respect Leamington will fulfil the highest expectations. The town, with a small but beautiful park which on the Continent would be called an “English Garden,” has an air of quiet orderliness, though it is not devoid of animation; while, lying in the heart of Shakespeare’s country, the neighbourhood possesses the attractions of beautiful rural scenery combined with associations of the highest interest both literary and historical.

Amusements.—The opportunities for recreation are ample. There are many interesting walks in the neighbourhood, which abounds in places of historic interest, such as Kenilworth, Warwick, Stratford-on-Avon, Compton Wynyates and Edgehill. The roads for motoring and cycling are excellent. There are facilities for boating, cricket, tennis, golf (three courses), croquet and polo; while, in the hunting season, two packs of fox-hounds and one pack of beagles are within easy reach.

An orchestra plays twice daily in the Pump Rooms during the autumn and winter, and in the summer music is provided in the Jephson and Pump Room Gardens. There is a constant change of programme at the theatre, and concerts take place at frequent intervals during the season.

The distance by rail from Birmingham is 23 miles, from Rugby 15, from Coventry 9, and from Warwick 2.

Accommodation.—There is ample accommodation for visitors. The hotel charges vary from 10s. 6d. to 12s. 6d. per

day, and those of private hotels from 7s. 6d. to 9s. 6d. For those who prefer apartments there is a wide choice at reasonable prices.

Contributed by the Leamington Medical Society.

Leamington, Warwickshire. Population, 26,000. Height above sea-level, 170–235 feet. Distance from London, 87 miles. Time of journey, $1\frac{1}{2}$ hours. Bathing establishment open all the year round. Chief season, April to October. For general information apply to the Town Clerk, Leamington.

Hotels.—Regent Hotel; Manor House Hotel.

LLANDRINDOD WELLS, WALES.

Mineral Waters : Muriated; Sulphuretted; Chalybeate.

General Characteristics.—Llandrindod Wells is a comparatively small, but rapidly growing spa, situated in Radnorshire, that Welsh border county which is the most sparsely populated of any in England or Wales. The town itself is built on a plateau which slopes upwards to the north and east, and downwards to the river Wye, distant some five or six miles to the west. It lies—although not surrounded by them—among hills of moderate height, which to the north-east, however, rise to over 2,000 feet, in the mass known as Radnor Forest. To the west and south-west, between the town and the sea, which is about forty miles distant, are hills of from 1,500 to 1,700 feet high.

Rainfall and Temperature.—The hills to the north and east protect the spa from the cold winds, while those on the seaward side arrest much of the rain brought by the moist south-west winds. Thus, while places ten or twelve miles off have an annual rainfall of sixty inches or more, at Llandrindod itself the fall is only thirty-five inches. Although this amount is in excess of that of many places farther east, the climate is remarkably dry and bracing. The atmosphere is cleansed by the rain which passes through it, but does not retain the moisture; and dull, heavy days in summer, and fog in winter, are decidedly rare.

The dryness of the air is no doubt largely due to the fact that the county contains a good deal of bare (though not unpicturesque) moorland; while the main river, the Wye, lies in a deep valley, at some distance from Llandrindod. Sunshine and wind have not, like the rainfall, long been accurately recorded; but the town's upland position ensures it a more than average amount of direct sunshine. The winds, including the prevalent south-west, are tempered by the higher hills in the distance.

Another quality of the air is its purity. Not only is Radnorshire sparsely populated, but there are no factories in the county, and scarcely any in the surrounding country.

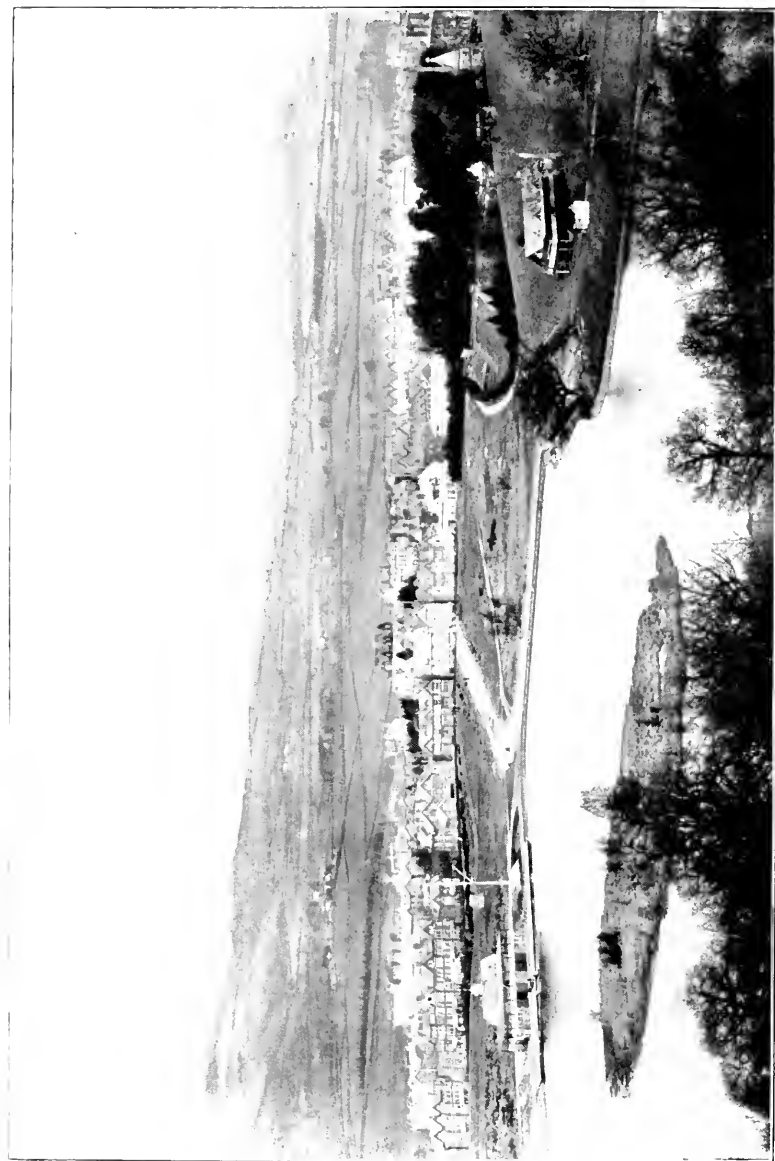


Photo by Ducey, Llandrinod Wells.

LLANDRINOD WELLS.

[To face p. 75.]

History.—As a spa, Llandrindod has had more or less repute for about two centuries. There are not wanting historians who claim that Pliny refers to it under the name of “Balnea Siluria.” It is not impossible that this may be so, as, at Castell Collen, a Roman Camp about a mile and a half from Llandrindod, now being excavated, there are evidences of what must formerly have been a fair-sized town; while it is known that lead mines in the immediate neighbourhood were worked by the Romans. It has been only during the last thirty or forty years, however, that people, in any considerable number, have resorted to the place on account of its mineral springs; and until comparatively recently such treatment as was given was purely empirical. Proper analysis of the springs in existence at the time were made in 1879, since when there have been steadily increasing efforts on the part of medical men and of the local authorities to obtain serious consideration for the mineral waters; a practical means to which end has been the installation of suitable baths and accessory appliances.

Mineral Waters.—The waters at Llandrindod are to be classed as muriated, and include sulphuretted salines and chalybeates. Their most marked characteristic, and one which they have in common, is a low mineralization; the mixed salts varying from 1·8 per 1,000, to 6·2 per 1,000. These salts, as can be seen from the accompanying table, consist mostly of chlorides. The sodium chloride, as in most saline waters, predominates; though in “New Spring” (Recreation Ground), and one or two others, there is a fair proportion of the chlorides of calcium and magnesium.

The springs described as “sulphur” waters would be more correctly designated as sulphuretted; for—though weak in sulphates—they contain a considerable quantity of hydrogen sulphide.

The chalybeate springs are three: the Old Chalybeate, a free spring in the Rock Park; the Roman spring, in the same locality, and the “New Spring” in the Recreation Ground. The quantity of iron contained in these waters is very small, but, by popular repute and by the experience of local medical men, they are found useful in many cases of anæmia and general debility. It is open to argument how far the calcium salts in these springs are of value, but in many cases where,

on theoretical grounds, one would administer calcium, these mild chalybeates are found to be beneficial.

Although all the waters contain gases in solution or suspension, none are to be classed as aerated. They are all cold.

The spring known as the Radium Sulphur is the only one which so far has been tested for niton. The emanation was found to be present, but the amount was not calculated.

It has been the practice for some years in the majority of cases to administer the saline waters hot; the heating being effected by passing them through pipes heated on the outside by steam. They are taken early in the morning, the quantity varying from three-quarters of a pint to two pints and a half. In a large number of cases they act as mild evacuants, and their cleansing effect on the bowel is shown by the colour of the motions and the definite reduction in the quantity of matter passed; this being presumably due to lessened bacterial action. As one would expect of waters of low mineralization, their range of action is not limited to the bowel. The kidneys are flushed even by the stronger saline.

But it is from the sulphur waters—especially from the least mineralized—that one looks for and obtains the greatest diuretic effect. Careful observations show that these waters cause diuresis without irritation, even in damaged kidneys; that is to say, in the so-called gouty kidney, and kidney of chronic Bright's disease.

The work of Widal, Javal and others has demonstrated the danger of the ingestion of sodium chloride, even in the quantities frequently taken dietetically; while some writers have gone so far as to adopt the assumption that all saline waters are dangerous. Whether or not this be the case with some which are highly mineralized, it is certainly not true of the Llandrindod sulphur waters. More and more are we resorting to their use in those cases of gout, arterio-sclerosis, renal calculus and slight albuminuria in which free flushing with a non-irritating medium is indicated. In many cases of œdema, especially in the forms often confused with obesity, the ingestion of these waters relieves the œdema and brings about a corresponding reduction of weight.

Subjoined are the analyses of the principal muriated and sulphuretted springs:—

| Name of Spring | | | Radium Sulphur. | | Magnesium. | | Lithia Saline. | | Old Saline Pump House. | | Sulphur Pump House. | |
|--|--|--|--------------------|---------------------|--------------------|---------------------|--------------------|---------------------|------------------------|---------------------|---------------------|---------------------|
| Constituents. | | | Grains per Gallon. | Parts per Thousand. | Grains per Gallon. | Parts per Thousand. | Grains per Gallon. | Parts per Thousand. | Grains per Gallon. | Parts per Thousand. | Grains per Gallon. | Parts per Thousand. |
| Chloride of Sodium | | | 80.7 | 1.153 | 236.46 | 3.378 | 279.8 | 3.99 | 334.24 | 4.775 | 162.8 | 2.325 |
| " Calcium | | | 30.8 | .44 | 89.9 | 1.27 | 73.26 | 1.46 | 68.43 | .977 | 49.21 | .703 |
| " Magnesia | | | 14.34 | .205 | 49.42 | .766 | 14.91 | .213 | 2.61 | .037 | 2.61 | .037 |
| " Potassium | | | .93 | .0133 | 1.4 | .02 | — | — | 2.1 | .03 | trace | trace |
| " Lithium | | | .34 | .005 | trace | trace | 8.83 | .655 | strong trace | strong trace | trace | trace |
| Carbonate of Lithium | | | — | — | — | — | 5.7 | .085 | — | — | — | — |
| Chloride of Thallium | | | — | — | trace | trace | 1.2 | .017 | trace | trace | — | — |
| Carbonate of Calcium | | | 1.6 | .023 | — | — | — | — | 3.5 | .05 | 9.6 | .137 |
| Silica | | | — | — | .19 | .0027 | — | — | .23 | .0033 | — | — |
| Nitrate of Calcium | | | .82 | .0117 | 4.14 | .059 | — | — | 1.7 | .024 | 2.38 | .034 |
| Sulphate of Calcium | | | — | — | — | — | — | — | .41 | .006 | .7 | .01 |
| Iron Oxide | | | .41 | .0058 | .7 | .01 | trace | trace | 1.15 | .016 | .5 | .007 |
| Oxide of Alumina | | | .3 | .0043 | 1.05 | .015 | 3.34 | .048 | — | — | — | — |
| Carbonate of Magnesia | | | 2.49 | .035 | — | — | — | — | — | — | — | — |
| " Iron | | | — | — | — | — | — | — | — | — | — | — |
| Bromide of Potassium | | | — | — | — | — | — | — | .02 | .00028 | .2 | .0028 |
| Iodide of Potassium | | | — | — | traces | traces | — | — | — | — | trace | trace |
| Nitrates | | | — | — | — | — | — | — | — | — | — | — |
| Nitrites | | | — | — | — | — | — | — | — | — | — | — |
| Bromide of Sodium | | | — | — | — | — | — | — | — | — | — | — |
| Iodide of Sodium | | | — | — | — | — | — | — | — | — | — | — |
| Alumina | | | — | — | — | — | — | — | 25.20 | .36 | 21.24 | .303 |
| Water of Combination | | | — | — | — | — | — | — | — | — | — | — |
| Radium | | | strong trace | strong trace | — | — | — | — | — | — | — | — |
| Phosphates of Iron and Alumina | | | — | — | — | — | — | — | 1.17 | .016 | .1 | .0014 |
| Oxides of Iron and Alumina | | | — | — | — | — | — | — | — | — | — | — |
| Sulphide of Ammonia | | | — | — | — | — | — | — | — | — | .21 | .003 |
| Total Solids | | | 133.73 | 1.8961 | 383.26 | 5.4607 | 382.04 | 5.803 | 440.76 | 6.2946 | 249.55 | 3.563 |
| Nitrogen | | | 14.2 | 52.54 | 4.98 | 15.896 | 1 | 8.7 | 6.27 | 23.2 | 5.77 | 21.349 |
| Oxygen | | | 8.1 | 29.97 | .23 | .85 | .5 | 1.85 | 2.52 | 9.324 | .61 | 2.257 |
| Sulphuretted Hydrogen | | | 14.35 | 53.075 | 1.6 | 5.92 | 2.5 | 9.25 | .35 | — | 2.92 | 9.694 |
| Carbonic Acid | | | 2.2 | 8.14 | — | — | — | — | — | 1.295 | 1.75 | 6.475 |
| Total Gases | | | 3.85 | 143.725 | 6.91 | 25.566 | 4 | 14.8 | 9.14 | 33.819 | 10.75 | 39.775 |

Bathing Establishments.—The bathing establishments at Llandrindod are not housed in imposing buildings, but money has not been stinted in providing the best appliances usually found at leading spas. The natural sulphur water is used for immersion baths and the various douches; while, in addition, the patient can obtain douche-massage (both Aix and Vichy), as well as treatment on the Nauheim and Plombières principles.

A complete equipment of Tyrnauer apparatus has for some time been installed, and the various heat, light and electric baths are given. The attendants are carefully selected, and there are a relatively large number of fully trained Swedish masseurs and masseuses. It is intended to erect an Inhalatorium as soon as practicable.

There are two sets of springs and baths in the town; one being at the Pump House and the other at the Rock Park. It is one of the advantages of the spa that the needs both of those who like an open situation and of those who prefer a protected one, are thus met; the Rock Park being in a little glen, well sheltered from cold winds, while the Pump House, though not in an exposed position, is close to The Common—an open ground of considerable extent, which is much used as a promenade.

Indications.—For what diseases and morbid conditions may an invalid go to Llandrindod, with hope of at least as good results as he can obtain elsewhere? Practically, for all morbid conditions which depend on imperfect elimination of waste products or on defective oxidation; that is, all the diseases of metabolism; as gout in its many forms, glycosuria, obesity, rheumatism and the various forms of chronic arthritis, most dyspeptic conditions, and toxæmia. As at other spas, provision is made for the treatment of injuries and diseases of fibrous tissues and joints. Among the conditions described as toxæmic must be included arterio-sclerosis in its earlier stages. In chronic skin diseases associated with disordered metabolism, the internal and external exhibition of the sulphur waters is found to be very useful. Lastly, those do well who are suffering from anæmia, neurasthenia or debility, whether due to acute illness, overwork, or residence in hot or unhealthy climates.

As a Climatic Resort.—Apart from its possession of mineral springs, Llandrindod Wells may justly lay claim to rank high



Lent by the Health Resorts Association]

ALPINE BRIDGE, LLANDRINDOD WELLS.

[To face p. 82.]

as a climatic health resort; and, indeed, it is probably to its combination of dry, bracing climate, pure air and bright sunshine, with waters of low mineralization, that the place owes its growing popularity and success.

Diet.—The local medical men have considered carefully the question of diet, and though no rigid system has been adopted as at some Continental spas, directions are given to the hotel keepers to provide food suitable for patients suffering from various morbid conditions requiring special treatment.

The general dietary is on the English system; meat, fish and poultry being served plainly cooked, without the addition of sauces or condiments.

Recreations.—The country surrounding Llandrindod is hilly, but open; and visitors can roam to their hearts' content, amid delightful scenery, over moors which vary in altitude from 800 to 1,200 feet. Farther afield we have one of the most charming valleys in either England or Wales, that of the Wye; and the mountains of Brecon. The Elan Valley—in which lie the picturesque artificial lakes from which Birmingham, sixty miles away, draws its water supply—is well worth a visit.

As auxiliaries to the treatment, and to vary its monotony, the visitor may enjoy golf, on excellent links, rowing on a small lake, and bowls. He can have good salmon and trout fishing on the Wye, and steps are being taken to make the trout fishing on the river Ithon, which winds close to the town for some miles, an additional advantage to the spa. The roads in the neighbourhood are good for motoring and cycling. Dramatic performances and outdoor and indoor concerts are arranged at frequent intervals during the season, and, as time goes on, more and more is being done for the amusement of the invalid. But, in view of the importance of open-air life during the treatment, it is to out-of-door recreations, more especially, that those interested in the development of Llandrindod are turning their attention.

Visitors from the Continent will find at Llandrindod Wells a dry and bracing climate, in a typical English rural setting, with the bathing facilities of a modern spa. It is essentially a place for mental rest and for outdoor amusements rather than a pleasure resort, and is specially suitable for invalids who are able to take a moderate amount of exercise.

In conclusion may be quoted some observations of the writer of *Spa Treatment and the Choice of a Suitable Spa*, who says :—

“ Yet in situation and climate Llandrindod has features not, as far as I know, shared by any other spa. The winds from the west reaching the elevated plateau on which the town stands, seem to retain the softness and purity of the Atlantic air, while, perhaps from a partial loss of moisture, they acquire a more exhilarating character. Some observers who have noted the temperature at which they usually begin to be conscious of a sense of chill, have found that their ‘ chill point ’ is perceptibly lower at Llandrindod. To this peculiarity, as well as to the positive warmth, may be ascribed the fact that the bathing season at this resort lasts in reality, and not merely by courtesy, from May to October.”

Contributed by the Llandrindod Wells Medical Society.

Llandrindod Wells, Radnorshire. Population, 3,000. Height above sea-level, from 700 to 800 feet. Bathing establishments open from April to November (one of them open all the year round). Chief season from May 1 to October 31. Annual rainfall, 35 inches; annual sunshine not recorded.

Distance from London, 192 miles. Time of journey, 5 hours 20 minutes.

For general information apply to the Secretary of the Development Association, or to the clerk to the Urban District Council.

Hotels.—Rock Park Hotel; Hôtel Métropole; The Pump House Hotel; Montpellier Hotel; Kingsland Private Hotel.



[To face p. 85.]

LLANGAMMARCH WELLS.

LLANGAMMARCH WELLS, WALES.

Mineral Water : Muriated, of low mineralization.

Relatively high barium content.

LLANGAMMARCH WELLS is a small village, situated midway between Swansea and Shrewsbury, on the River Irfon, a tributary of the Wye. It lies in an open valley, at an altitude of 560 feet. To the south rises the Eppynt Mountain, which attains a height of over 1,500 feet; while to the north there is a large range of hills and moorland, extending as far as Plinlimmon.

History and General Characteristics.—The spa is three-quarters of a mile from the station and village. The well now in use was discovered about the year 1832 by a shepherd, who happened to notice a spring issuing from the bed of the river, which was then unusually low. Subsequently the course of the stream was diverted, and the Pump Room built over the spring. Near the well are two hotels, situated in grounds of much beauty, which stretch along the banks of the river for more than half a mile. These grounds face west, and are sheltered on the east by a wooded cliff which rises abruptly for about 150 feet. Above the spa there is another hotel, which commands extensive views of the valley of the Irfon and the distant mountains.

Climate.—The air is exhilarating, the prevailing winds blowing over an open moorland country from the sea, twenty-five miles distant. The temperature in summer is a little lower than that of the Midland counties, while in winter the climate is mild and snow seldom falls.

Mineral Water.—Though there are other springs in the near neighbourhood, only the mineral water derived from the well already referred to is commonly used at Llangammarch. This is remarkable for its relatively high barium content, the barium existing as a chloride.

Subjoined is the analysis made for *The Lancet* in 1894 :—

| ANALYSIS. | | |
|-----------------------------|-----------------------|------------------------|
| | Grains per Gallon. | Parts per Thousand. |
| Chloride of Barium . . . | 6·749 | ·0964 |
| „ Sodium . . . | 186·200 | 2·66 |
| „ Calcium . . . | 85·160 | 1·2165 |
| „ Magnesium . . . | 20·100 | ·287 |
| „ Lithium . . . | ·847 | ·0121 |
| „ Ammonium . . . | ·262 | ·0037 |
| Alumina and Silica . . . | 3·340 | ·0477 |
| Bromine as Bromide . . . | distinct traces | — |
| <hr/> | | |
| Total mineral matters . . . | 302·658 | 4·3234 |

Temperature of the water, 50° F. Reaction neutral. No free carbonic acid in solution. Sulphates absent. The presence of barium as the chloride is rare in mineral waters, owing to the existence in most of them of soluble sulphates, which would cause precipitation of insoluble barium sulphate.

Internal Action.—Physiologically and therapeutically barium acts on the cardiac muscular fibres by slowing and strengthening their contractions, and so, like digitalis, prolonging diastole as well as strengthening systole (Lauder Brunton, *Lectures on the Action of Medicines*). The muscular tunic of the arteries also undergoes stimulation. An early effect, then, of the ingestion of this barium water is slowing of the pulse rate with an increase of arterial tension. Barium, like digitalis, again, has the secondary action of promoting diuresis; but whereas usually, for the furtherance of this object, other pharmaceutical agents are combined with the drug, in our barium water there exist natural salts which probably serve as auxiliaries. However this may be, a notable increase in diuresis—in some cases up to 50 or even 100 per cent.—follows the ingestion of barium water. Almost as remarkable is the increased output of uric acid. As a final result of this elimination of both water and solids, peripheral resistance falls. The bowels are unaffected, except by the bulk of the fluid and the hour at which it is taken.

Action of the Baths.—In the reclining bath the action corresponds with that observed at Nauheim and elsewhere. That is to say, it depends chiefly on the temperature of the water, the duration of the immersion and the general technique employed. The first effect may, at will, be that either of sedation

or of stimulation; but the final result always aimed at is relief to back pressure. The share borne by barium or any other saline constituent in the results obtained, cannot be stated with confidence. In suitable cases massage, resisted exercises and graduated hill climbing are made use of.

The clinical effects of barium water in cases of heart disease will be found described in *The Lancet* of November 23, 1907.

The following table shows the amount of uric acid passed before and during the treatment. The uric acid was estimated by Hopkins's method, and in each case the amount is the mean of two observations.

| Case. | Normal diet. | | | Days after first experiments. | Drinking mineral water. | | | | |
|-------|----------------|------------|------------------------|-------------------------------|-------------------------|--------------------------------|------------|------------------------|--------------------------------|
| | Urine. | Uric acid. | | | Urine. | | Uric Acid. | | |
| | Amount in c.c. | Per cent. | Total output per diem. | | Amount in c.c. | Increase or decrease per cent. | Per cent. | Total output per diem. | Increase or decrease per cent. |
| 1. | 1440 | ·058 | grms. ·83 | 14 | 1900 | + 31 | ·066 | grms. 1·25 | + 50 |
| | 1130 | ·091 | 1·03 | 6 | 1530 | + 35 | ·087 | 1·34 | + 30 |
| 2. | 483 | ·0675 | ·318 | { 15 | 653 | + 35 | ·0787 | ·513 | + 61 |
| | | | | { 35 | 650 | + 34 | ·0385 | ·25 | - 22 |
| 3. | 2000 | ·0206 | ·400 | { 10 | 2850 | + 42 | ·600 | ·855 | +113 |
| | | | | { 60 | 1560 | - 22 | ·0146 | ·287 | - 44 |
| 4. | 1120 | ·0423 | ·47 | 11 | 1700 | + 51 | ·033 | ·561 | + 19 |
| 5. | 840 | ·0206 | ·175 | 15 | 1700 | +102 | ·0273 | ·464 | +165 |
| 6. | 1420 | ·0275 | ·39 | { 10 | 1700 | + 20 | ·0238 | ·404 | + 3 |
| | | | | { 18 | 1700 | + 20 | ·0135 | ·229 | - 42 |
| 7. | 1036 | ·0417 | ·467 | { 12 | 1850 | + 77 | ·012 | ·222 | - 110 |
| | | | | { 25 | 1850 | + 77 | ·0169 | ·312 | - 34 |

Indications.—Llangammarch water is indicated for those forms of cardiac and arterial disease which will be influenced favourably by the sequence of action above described. The best results have been observed in cases of myocardial weakness and early dilatation with or without valvular lesion; irritable heart following gout, tobacco poisoning, influenza, and—in some instances—angina pectoris.

The water is also of service in the treatment of articular gout, rheumatism and rheumatoid arthritis. The average dosage per diem is 30 ounces. Some years ago the action of barium water was observed, in patients suffering from the maladies commonly treated here, to determine the increase in output of water and uric acid. For a full report of the cases the reader is referred to *The Lancet* of March 25, 1899, and June 30, 1900. Here it is sufficient to say that while these notable

results were being obtained, the patients improved in every way. Control was effected by giving to each patient a pint and a half of ordinary water for a few days before the treatment, while, during the course, a like dose of barium water was substituted.

Method of Administration. (1) *Internally*.—The mineral water is administered internally as follows: one or two tumblers, of the capacity of some 10 oz., are taken about an hour before breakfast; the patient sipping the water slowly, and walking for a short time after each glass. Another glass is taken at about eleven o'clock, or noon; and a last one in the afternoon. If the water cause symptoms of dyspepsia, it is given hot, when it rarely occasions any digestive trouble.

(2) *By Baths*.—The baths are usually taken every other day; on the intervening days massage or resistance exercise being prescribed. After the bath, the patient—wrapped in hot towels—rests for half an hour on a couch. The temperature of the first bath is usually 95° F., this being gradually reduced at each successive bath to 90° F. To begin with, the patient is immersed for from five to ten minutes; a period which, after a few baths, is increased to fifteen minutes.

Massage, etc.—In addition to the baths, massage is an important factor in the treatment, and, in selected cases, hill climbing is prescribed, after the methods of Oertel.

Amusements.—There is an excellent golf course of eighteen holes—one of the most sporting links in Wales; as well as provision for tennis, croquet and bowls. The Irfon is a capital trout stream, and salmon may be caught in the autumn. Good rough shooting is to be had over several thousand acres of mountain and moorland. The visitor will find many spots of beauty in his walks or drives about the neighbourhood.

Accommodation.—Besides the hotels already referred to, there are several houses at which apartments and board may be obtained.

W. BLACK JONES, M.D., B.S.

Llangammarch Wells, Breconshire. Population, 790. Height above sea-level, 560 to 645 feet. Bathing establishment open from May to October.

Distance from London, 213 miles. Time of journey, 5½ hours.

Hotels.—Lake Hotel; Bungalow Hotel; Afan Lodge Hotel; Cammarch Hotel.

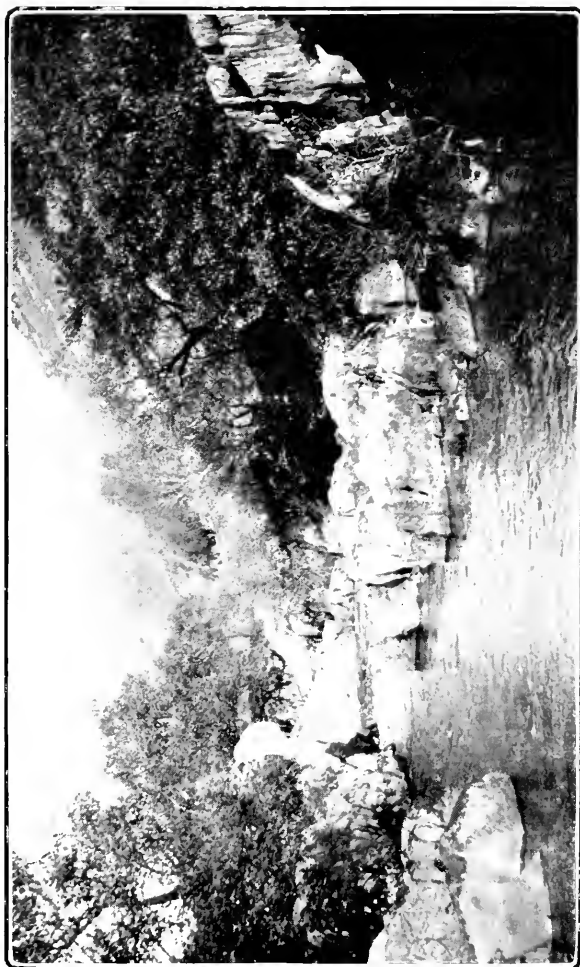


Photo by D. L. Williams.

LLANWRTTYD WELLS, A RIVER VIEW.

LLANWRTYD WELLS, WALES.

Mineral Waters : Sulphuretted ; chalybeate.

General Characteristics.—Llanwrtyd (to the pronunciation of which “Lan-oor-tid” gives a close enough approximation) is on the Central Wales section of the L. & N. W. Railway—a section which runs through country unsurpassed by any in the principality for beauty of scenery and wealth of historical associations. The surroundings of Llanwrtyd itself are romantic and boldly picturesque, and of a character which appeals especially to lovers of the wild and primitive in nature. The general aspect is mountainous and rugged, but the charms of wood and moorland, valley and stream, vary and soften the sterner features of its beauty. Some of the mountains rise to a height of more than 2,000 feet above sea-level; but the altitude of Llanwrtyd subtracts some 700 or 800 feet from the task of climbing them, and one (The Garn) can be ascended straight from the Spa, without any intervening walk. The view from its summit (2,000 feet high) will amply repay the exertion.

Mineral Waters.—The springs of Llanwrtyd have been known for their curative and health-giving properties since 1732. It was in that year, at any rate, that a certain Reverend Theophilus Evans, observing that frogs prospered in the waters of one of the springs, despite the popular opinion as to the origin of its sulphurous odours, took heart of grace and tried it for “an obstinate and ineradicable scurvy,” with reassuring and eminently satisfactory results. Other wells have since been discovered and have added to the reputation of Llanwrtyd; but it is to the Dolecoed Sulphur Spring, in which the reverend gentleman so pluckily pioneered as a bather, that the place owes its origin as a spa.

The springs are situated near the village, about half a mile from the station, at the opening of a small valley, and are some seven hundred feet above sea-level.

Dolecoed Sulphur Spring.—The chief of them, the Dolecoed Sulphur, rises in a strong jet above the rock from which it issues. Common enough on the Continent, this is a characteristic very rare in Great Britain. The well is hermetically sealed under a glass cover, through which may be seen the gas-charged and bubbling water. Its outflow is abundant, being estimated at about 4,500 gallons a day. For drinking purposes the water is drawn direct from the source, without pumping, and led through ebonite pipes to the taps, thus losing none of its contained gas. For the baths it runs, by gravitation, through pipes of the same material, to coils which heat it to the requisite temperature; any escape of gas or precipitation of solids so being again avoided.

Sulphuretted Hydrogen, of which this spring contains as much as ten cubic inches to the gallon, has hitherto been deemed its chief medicinal agent. Most waters of similar composition have recently, however, been recognized as highly radio-active, and it is probable that when tested this one will not prove an exception.

Subjoined is the analysis of this spring by Prof. Attfield :—

| | Grains per Gallon. | Parts per Thousand. |
|--|-----------------------|------------------------|
| Chloride of Potassium | 1·692 | ·0241 |
| „ Sodium | 60·782 | ·8683 |
| „ Magnesium | ·871 | ·0124 |
| „ Calcium | 13·486 | ·1926 |
| Sulphate of Calcium | ·827 | ·0118 |
| Carbonate of Calcium | 2·005 | ·0286 |
| Oxide of Iron | ·043 | ·0006 |
| Silica | 1·323 | ·0189 |
| Lithium, Barium, Bromine, Iodine and Nitrates | traces | — |
| Total | 81·029 | 1·1573 |
| Sulphuretted Hydrogen, cub. in. | 10·0 | |
| (Specific gravity, 1·0011.) | | |

Clinical experience confirms the benefit of this water in those diseases in which it would seem to be indicated theoretically.

Internal Action of Dolecoed.—When taken internally, the primary action of the water is diuretic and diaphoretic, while it is probable that it has also a mild antiseptic effect.

In consequence of the eliminatory action set up, the blood pressure is found to fall.

The water is favourable to the metabolism of urea, as inducing an increased output of that compound.

So considerably is diuresis increased by its use, that small renal calculi are frequently discharged. The same flushing action takes place in the biliary passages; an effect clearly indicated for patients suffering from inspissation of bile.

The water is not aperient, except when given in massive doses.

Indications for Dolecoed Sulphur Water.—It is thus evident that the spring is of service in all constitutional conditions in which elimination by the renal or cutaneous routes is indicated, and chiefly in gout, rheumatism, rheumatic arthritis, arteriosclerosis, chronic renal disease, neuritis and neurasthenia of toxic origin, and renal and hepatic calculosis.

Whether used internally or externally, the action of this water on the skin would seem to be of a specific nature. The cutaneous affections usually sent for treatment are chronic eczema, psoriasis, acne vulgaris and rosacea, furunculosis and seborrhœa.

Victoria Wells.—Other springs are the Victoria Wells, so called from their discovery in the Diamond Jubilee year of 1897. One of these is known as the Lithia Saline. Its water, otherwise of composition nearly similar to that of the Dolecoed Sulphur Spring, is remarkable in containing per gallon 2·4 grains of lithium chloride and 1·16 grains of thallium chloride. In addition to H_2S , oxygen, nitrogen and CO_2 are present.

The analysis by Mr. Embry, F.C.S., is as follows :—

| | Grains per Gallon. | Parts per Thousand. |
|---|-----------------------|------------------------|
| Sodium Chloride | 62·16 | ·888 |
| Calcium Chloride | 8·46 | ·120 |
| Lithium Chloride | 2·4 | ·034 |
| Thallium Chloride | 1·16 | ·016 |
| Magnesium Carbonate . . . | 1·32 | ·018 |
| Oxide of Iron and Aluminium . | ·14 | ·002 |
| Silica | ·77 | ·011 |
| <hr/> | | <hr/> |
| Total solid matter | 76·41 | 1·089 |
| Oxygen, Nitrogen, Carbon Dioxide and Sulphuretted Hydrogen, cub. ins. | | 8·7 |

Indications for the Lithia Saline.—This water has proved beneficial in gouty, rheumatic, rheumatoid and neurasthenic conditions. It is a remedial agent, also, in subacute and chronic gastritis and colitis. It seems to act as a sedative to the mucous membrane, and to lessen the secretion of mucus. The best results are obtained by drinking the water and also by applying it externally by bathing, in conjunction with electricity; for which purpose an electrical installation is provided.

The waters of the other springs in this group are sulphuretted, magnesian-sulphuretted and chalybeate. Whether or not sulphuretted waters are of real service in scrofulosis has long been a disputed point. Be that as it may, and whether the results are to be credited to its springs or to its fine air, scrofulous cases undoubtedly receive great benefit at Llanwrtyd.

There are two chalybeate springs—both of light mineralization. The weaker contains $\cdot 79$ grains of ferrous carbonate per gallon, or $\cdot 011$ parts per thousand. The stronger contains $1\cdot 522$ grains of the same salt per gallon, or $\cdot 0211$ parts per thousand.

These are useful in all cases for which iron is indicated; while the iron, as will be observed, occurs in its least irritating form—that of the carbonate.

Climate.—The climate of Llanwrtyd, though bracing, is equable. The temperature in winter rarely falls even so low as freezing point; while, in summer, cool mountain breezes are seldom lacking to relieve the warmest weather of oppressiveness.

Recreations.—The spa is a quiet one, and the amusements obtainable are chiefly such as keep its visitors in the open air: golf—for which there are two good links—fishing, shooting and fox-hunting in season; while otter hunting is obtainable during the spring and summer.

Baths.—The baths, though as yet not on a large scale, are adequately equipped. There is an installation for the various forms of electrical treatment, and light baths (Dowsing), as well as Nauheim baths, are obtainable.

Accommodation.—There is ample and good accommodation for visitors, both at the hotels and boarding-houses, and no

lack of satisfactory apartments for those who prefer that mode of life.

W. T. REES, M.R.C.S., L.S.A.

Llanwrtyd Wells, Breconshire. Population, 737. Height above sea-level, 700–800 feet. Distance from London, 230 miles. Time of journey, $5\frac{1}{2}$ hours.

For general information apply to the Hon. Sec., Improvements Committee, Llanwrtyd.

Hotels.—Dolecoed Hotel; Abernant Lake Hotel.

MALVERN.

General Characteristics.—The Urban District of Malvern comprises in its area the following subdivisions: Great Malvern, the largest and most central; Malvern Link; North Malvern; West Malvern, and Malvern Wells. With two exceptions, these sub-divisions merge into one another, Malvern Wells being separated from Great Malvern by Malvern Common, a tract of grass land extending for some hundred acres, and the headquarters of the Worcestershire Golf Clubs; while another tract of common, smaller in extent, divides North Malvern from Malvern Link. Both these natural parks command fine views.

Owing to the configuration of the town, a great variety of climate is obtainable. The elevation varies from 300 feet at Malvern Link, to 900 feet at West Malvern; so that residents at one of the lower levels may find a complete change by a visit to the latter.

The hills stretch in an unbroken chain due north and south for a distance of nine miles, their highest point being the Worcestershire Beacon, 1,400 feet. From their heights are presented glorious and extensive views. Eastward lies the fertile valley of the Severn, the river rolling wide and deep between wooded slopes and green meadows, and winding onwards past Tewkesbury with its beautiful Abbey, until it loses itself in the waters of the Bristol Channel, which can, on clear days, be seen glistening in the sunshine. To the north, the Clent and Lickey Hills stand out as a background to Worcester, with its grand old cathedral. Across the valley, one catches a glimpse of distant Edgehill, and, nearer, descries the humpy mass of Bredon—at its foot the Avon, flowing from the plains of Warwickshire to its junction with the Severn at Tewkesbury. Farther south is Cheltenham, lying at the foot of the Cotswolds. Still farther to the south may be seen,



[To face p. 94.]

MALVERN FROM THE HILLS.

in clear weather, the smoke of the city of Gloucester, and the tower of its Cathedral.

From the western side of the hills, the view extends to the Wrekin in the distant north. More westerly, one discerns the Clee Hills, with the moors of Radnorshire, the Black Mountains and the Brecon Peaks. Nearer at hand stand the cathedral and the ancient city of Hereford; beyond which, again, lies the valley of the Wye, with its orchards and picturesque villages; the eye finally resting upon the dark masses of the Forest of Dean, rich in glades of oak, silver birch and beech.

The Hills, clothed with gorse and bracken, are readily accessible from the town, and winding, well-kept paths add to the pleasure of walks among them.

Malvern, standing on the hill-side, with most of its houses surrounded by gardens, gives an impression of space very refreshing to the city dweller. With its luxuriant growth of trees and flowering shrubs, it is an attractive place, particularly in the early freshness of spring, when the plum and pear orchards are in full bloom; or in autumn, with the rich and varied colouring of tree and hedgerow.

Geology and Climate.—The Malvern Hills are composed of Igneous rock, chiefly Diorite, but practically ranging from Diabase to almost true granite. Consequently, there is almost complete natural drainage, and the roads dry rapidly, even after heavy rains. It should be noted, too, that there is no large expanse of water in the neighbourhood, the relative humidity being therefore low.

Lying as it does on the slope of the Hills, and well below them, Malvern escapes the keener bitterness of the easterly winds. The climate is dry and equable, and the average rainfall decidedly low—27·8 inches.

The other chief climatic characteristics are that the air is gently stimulating, the daily range of temperature small, the summers comparatively cool, and the winters not severe. During the winter months an exceptional amount of sunshine is experienced, the morning sun frequently bathing the eastern slopes of the hills, while the valley beneath is enshrouded in mist.

The Water.—Malvern owes much of its reputation to its

excellent soft hill water. This continues to be bottled from the original spring, and is used as a table water in most parts of the world.

Indications.—The fine, gently stimulating air is suited to sufferers from early tuberculosis. Cases of chronic bronchitis and emphysema do well, and asthmatics (young people, especially) benefit greatly by a prolonged stay.

Rheumatism and arthritic disorders are uncommon among residents. Cases coming to Malvern improve greatly, and the arthritic condition is often arrested.

Granular contracted kidney, and gouty conditions, including arterio-sclerosis, derive much benefit from the altitude, the equable climate, and the purity of the water.

Renal calculus is practically unknown in the district. The comparative mildness of the winters, and the cool summers, are valuable factors in cases of incipient loss of compensation and deficient cardiac tone; and the accessibility of the hills makes the Oertel treatment easy to carry out.

The tonic properties of the air, the relative dryness, and the varied nature of its scenery render Malvern an ideal place for convalescence from acute illness, after operations, and in post-influenzal conditions. Its freshness of atmosphere and quiet are peculiarly invigorating to the weary brain-worker. Thus, neurasthenia and allied nervous conditions especially are improved.

Baths, etc.—There are facilities, of which full advantage is taken, for Droitwich brine baths, electric baths of various kinds, Plombières treatment and Swedish exercises.

In seeking to account for the excellent results obtained in all these diseases, due credit must be given to the effect of Malvern's air, altitude and charm of surroundings, upon visitors from crowded cities, or those who cannot tolerate a coast climate.

Those who require change of air will at all seasons find in Malvern a restful and quiet spot, mild in climate, for its elevation. In July and August it offers the invalid invigorating air when the majority of European spas are sweltering in heat.

Emphasis must be laid on the suitability of the climate for children and young adults. The improvement in weakly children from residence in the district is remarkable. The



Shelton

(To face p. 97.)

MALVERN, THE QUEEN'S DRIVE.

town has in consequence become an important educational centre, and, in addition to its well-known College, now possesses a number of preparatory schools both for girls and boys.

Recreations.—As to its resources for those who are able to enjoy out-door sports, the Malvern Golf Course is considered to be one of the best in the Midlands. There are tennis, croquet, bowls and archery. The town is an excellent centre for hunting, being within reach of five packs. In every direction the surrounding country offers, even to the invalid, opportunities for interesting walks and motor tours within easy distances, which will not fatigue him unduly.

Contributed by a Medical Committee at Malvern.

Malvern, Worcestershire. Population, 1,800.

Height above sea-level, from 300 to 900 feet.

Open all the year round.

Mean annual sunshine, 1,700 hours. Mean annual rainfall, 27·8 inches.

Monthly mean temperatures : January, 38·8°; February, 39°; March, 42·5°; April, 47·8°; May, 52·3°; June, 59·6°; July, 61·9°; August, 61·1°; September, 57·3°; October, 48·8°; November, 44·1°; December, 40·3.

Distance from London, 121 miles. Time of journey, 3½ hrs.

Hotel.—Foley Arms Hotel.

MATLOCK AND MATLOCK BATH.

Mineral Waters: Alkaline, bicarbonated and sulphated.

MATLOCK and Matlock Bath are situated on the river Derwent, in a beautiful part of the picturesque county of Derby, and approximately in the centre of England. As health resorts, they may be considered together, being very similar in climate, methods of treatment, and the cases for which they are suitable. Matlock Bath, which is the first to be reached from London, nestles in a narrow curve of the valley of the Derwent, between Masson Hill, 1,000 feet high, on the west, and lofty, wooded cliffs rising abruptly on the east. Not undeservedly, the neighbourhood has been called "The Switzerland of England," and the characteristic beauty of the scenery is maintained from Matlock Bath to Matlock, one of the most picturesque miles in all our island. Matlock lies partly in this valley and partly in the two broad ones which here branch from it; but the greater part of the town is on the southern and western slopes of the hill dividing them. This rises gradually to a height of 1,000 feet, and is capped by pine-woods and moorland. Here are the Hydros to which Matlock largely owes its prosperity; their situation commanding fine and varied views of valley, hills and woods.

History.—Some of the warm springs at Matlock Bath were used locally as early as the seventeenth century, and in the eighteenth they became well known, and Matlock Bath a fashionable health resort. With the advent of the railway, toward the middle of the nineteenth century, its popularity began to wane, owing, probably, to inadequate accommodation and lack of the enterprise necessary to counterbalance the growing attractions of other resorts.

Then it was that Matlock—at that time a small, straggling village—saw the beginning of that system of hydropathic treatment which has since made it famous. John Smedley, a wealthy worsted manufacturer, who had fallen into ill-health,



MATLOCK, HIGH TOR.

[To face p. 98.

and found himself benefited by hydropathic treatment at Ben Rhydding, took up the study and practice of it in his leisure time, and, in 1853, founded at Matlock the institution which, now housed in greatly enlarged buildings, still bears his name. Until 1872 the treatment was in the hands of Mr. Smedley and his wife, both of them without medical training. From that time onwards it has been under the direction of qualified physicians.

Other hydros under similar supervision are the Rockside and Matlock House.

The continued success of Matlock has of recent years inspired measures to revive the popularity of Matlock Bath, where The Royal Hotel, in particular, has been equipped for hydropathic and allied treatments, while a Pump Room and Kursaal have lately been established, where the warm spring waters may be drunk, and in which concerts and other amusements are provided.

Mineral Water.—The mineral water of Matlock Bath closely resembles that of Aix-les-Bains both in chemical composition and in containing a colloid substance which, by lending to it an unctuous character, facilitates the application of douche-massage. Taken internally it would appear to be specially indicated for the elimination of toxins by the renal route.

The analysis by Dr. Dupre is as follows:—

| | Grains per Gallon. | Parts per Thousand. |
|---------------------------------|-----------------------|------------------------|
| Chloride of Sodium . . . | 4·57 | ·0652 |
| „ Potassium . . . | traces | traces |
| Bicarbonate of Calcium . . . | 14·68 | ·2099 |
| Sulphate of Magnesium . . . | 9·73 | ·139 |
| „ Calcium . . . | 2·04 | ·0291 |
| Silica | ·71 | ·0101 |
| Aluminium, Lithium, Strontium . | 1·03 | ·0147 |
| | <hr/> 32·76 | <hr/> ·4594 |

The water contains a considerable volume of free carbonic acid gas.

The temperature is 68° F., which brings it within the category of thermal waters.

By the possession of this spring (rising in the grounds of the Royal Hotel), Matlock Bath takes rank as a spa.

Climate.—The climate of the Matlocks is mildly bracing. Well sheltered on the north and east, they are suitable as health resorts all the year round, and no particular season need be specified. The character of the climate is shown by the meteorological data given at the close of this article.

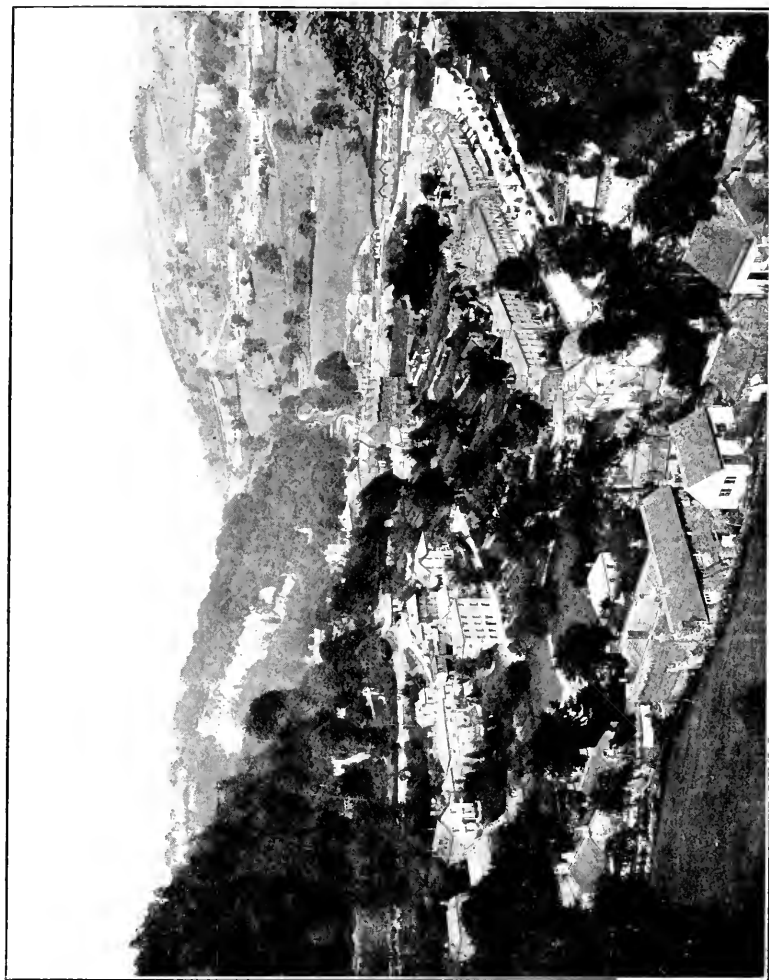
The advantage of the Matlocks and of the method of treatment practised there can be fully appreciated only by bearing in mind that the hydros are cure establishments, each of which serves, as it were, as a self-contained health resort. Patients take their whole treatment under one roof, so avoiding exposure and its attendant risks. As much of the course can be given in the patient's bedroom, it is available even for debilitated subjects. The aims and the system of a hydro, moreover, impose reasonable hours, regularity in meals, and a routine of daily life planned so that the time may be spent to the best advantage.

At these hydros suitable dietaries are arranged for patients suffering from such ailments as general debility, anaemia, dyspepsia, gout, rheumatism, obesity, acute febrile conditions, and so on. There are balconies with couches, where patients can lie out of doors from morning till evening—at Matlock, the whole year round.

At the best equipped hydros most of the appliances for balneotherapy commonly found at the spas are installed. Speaking comparatively, however, more use is made of packs and Turkish baths.

Recreations.—The usual outdoor games are played in the grounds of the hydros, while indoors there is a constant succession of amusements. At Matlock there is an eighteen-hole golf course, alongside the moorland, at a height of 800 to 900 feet above sea-level. There is, also, a nine-hole course at Matlock Bath.

Indications.—No particular disease is specialized in at Matlock; with the exception of infectious and surgical diseases, and tubercular lung ailments, all kinds of cases are treated. Among those deriving great benefit from the place and methods there employed may be included functional and organic nerve diseases, rheumatism, gout, rheumatoid arthritis, stomach and



MATLOCK BATH.

[To face p. 101.]

liver derangements, heart affections, non-tubercular lung diseases, diseases of the kidneys and bladder, colitis, female pelvic disorders, the anæmias, exophthalmic goitre, debility from various causes, strain of life, and many more.

G. C. R. H.

Matlock and Matlock Bath, Derbyshire. Open all the year round. Height above sea-level, from 300 to 1,350 feet. Mean annual sunshine (3 years), 1237·4 hours. Mean annual rainfall (3 years), 36 inches. Mean temperature for the year, 47·02° (3 years). Distance from London, 145 miles. Time of journey, 3½ hours.

Hotels and Hydros.—Hydros at Matlock: Smedley's Hydro-pathic Establishment; Rockside Hydro.

Hotel and Hydro at Matlock Bath: The Royal.

MOFFAT, N.B.

Mineral Water : Sulphuretted and muriated, of low mineralization.

MOFFAT is built on sloping ground, at the foot of a beautifully wooded hill. It is well sheltered on all sides except the south, in which direction there opens out a fine and extensive view, with Skiddaw and the Cumberland hills in the distance.

Climate.—The temperature throughout the year is wonderfully equable. Although the rainfall is somewhat above the average for the British Isles, it is seldom excessive; while—owing to the gravelly nature of the subsoil—the ground dries rapidly, even after very heavy showers. In spring and autumn clear, bracing weather is enjoyed; and its sheltered position makes Moffat a suitable place for invalids, even during the winter months. Some visitors complain that it is enervating in August.

Mineral Water.—The sulphur well is situated on a level plateau, nearly 300 feet above the town.

The following analysis was made in 1911 :—

| | Grains per Gallon. | Parts per Thousand. |
|-----------------------------|-----------------------|------------------------|
| Sodium Chloride | 64·043 | ·9149 |
| „ Sulphydrate | ·56 | ·0080 |
| Calcium Carbonate | 5·649 | ·0807 |
| „ Sulphate | 2·261 | ·0323 |
| „ Chloride | 7·714 | ·1102 |
| Magnesium Carbonate | 2·586 | ·0368 |
| „ Chloride | 4·088 | ·0584 |
| Potassium Chloride | 6·272 | ·0896 |
| Silica | ·658 | ·0094 |
| <hr/> | | |
| Total solids | 93·831 | 1·3403 |

In one litre there are dissolved 3·14 cc. of hydrogen sulphide and 18 cc. of nitrogen.

Internal Use.—The water has a marked diuretic effect in practically every case, and, owing to the small proportion of chlorides, it is not contra-indicated in renal affections associated with dropsy. It is employed chiefly in cases of gout, rheumatism, and abdominal plethora.

External Use.—The warm sulphur water baths allay nervous irritation. They are of service in sciatica, gouty and rheumatic affections of joints, seborrhœic eczema, and other diseases of the skin.

Recreation.—The bowling greens, tennis and croquet courts are said to be the best in the south of Scotland. A first-class eighteen-hole golf course has recently been laid out.

Accommodation.—There are hotels and a hydropathic establishment. Some of the lodging-houses are excellent.

Abstracted from papers by David Huskie, M.D.

Moffat, Dumfriesshire. Height above sea-level, about 370 feet. Open all the year round. Distance from London, 341 miles. Time of journey, 7 hours.

NANTWICH.

Mineral Waters : Strong Brine.

THE ancient market town of Nantwich, situated in the fertile valley of South Cheshire, forms the centre of a district of considerable natural beauty and much historical interest. At the time of the Civil War the town was the scene of a prolonged siege and otherwise played an important part in the military operations of the neighbourhood. At the present day, however, it bears but few marks of that stormy period, the mud walls and fortifications, for example, having been completely swept away.

The streets have an unfailing charm in the picturesque character of their quaint, old-fashioned, black-and-white houses; while the magnificent fourteenth-century church, with its mediæval stone pulpit and beautiful carved oak stalls, is an object of delight to all antiquarians.

Climate.—The climate of Nantwich is equable, mild and dry. The rainfall is below that of the western counties generally, fogs are infrequent and the winter months are naturally less severe than in places farther inland and at higher altitudes. These points tell in favour of Nantwich, both as a place of permanent residence for people in delicate health and as a resort for those who wish to undertake a bathing course.

Brine.—This is not as strong as the Droitwich brine. It is pumped up into reservoirs and thence supplied to the various baths.

Bathing Facilities.—The baths have every convenience for the comfort of patients. They consist of reclining, deep immersion, needle, douche, shower, hot air and Roman baths. "Nauheim treatment" and massage are carried out by experienced attendants. As the baths are in one of the hotels the invalid can reach his room after treatment without exposure or risk of cold.

There is a good installation for electric treatment.

Cases treated.—Cases of subacute or muscular rheumatism, or the painful sequelæ of rheumatic fever and acute rheumatism, undergo marked improvement from a prolonged course of the baths. Neuritis in its varied forms is greatly relieved; especially in the later stages, and more particularly when the bath is combined with electric treatment. Similarly, gout—except, perhaps, in its cutaneous manifestations—is much benefited, and rheumatoid arthritis is considerably relieved.

Accommodation.—In the matter of accommodation visitors may rely upon having every comfort and convenience.

Amusements.—One of the chief attractions of the town is that it is a great hunting-centre, within easy distance of the meets of five packs. Stabling in and around the town is ample.

Of the broad, level and well-made roads of South Cheshire little need be said, for they are well known to motorists and cyclists. The neighbourhood is admirably adapted to their requirements, and the places of interest in which it abounds make pleasant objectives for excursions.

C. C. L.

Nantwich, Cheshire.

Open all the year round. Chief season, from May to September.

Distance from London, 161 miles. Time of journey, 3½ hours.

Hotel.—The Brine Baths Hotel.

STRATHPEFFER SPA.

Mineral Waters: Sulphuretted, of low specific gravity.

General Characteristics.—Strathpeffer is situated in the south-east corner of Ross-shire, some twenty miles north-west of Inverness, in one of the most picturesque districts of the Highlands. The Strath itself is about five miles in length, sloping, from W.S.W. to E.N.E., gently downwards from an altitude of 350 feet to the Cromarty Firth. The northern boundary of the whole length of the valley is formed by the slopes of Ben Wyvis, which rises from an extensive base to a height of 3,500 feet. The valley opens out gradually at its east end towards the Cromarty Firth and Black Isle. Beyond the upper western extremity and the Conon Valley, rise the successive ridges of the central and western Ross-shire and Inverness-shire hills to 2,000–4,000 feet. The south wall of the Strath is formed by a narrow ridge of 600–800 feet, and this, as well as part of the lower slopes of the north side, is covered with larch and fir plantations.

Climate.—Strathpeffer, then, is efficiently protected from northerly winds by Ben Wyvis. West and south-westerly winds reach it after crossing a belt of hills of considerable height and some fifty miles wide, and are so deprived of much of their moisture and force. The proximity of the sea ensures the equability characteristic of marine climates in general. The nature of the climate may be inferred from : (1) The generally-rounded contour of the hills, indicating a moderate rainfall (the annual average being just over thirty inches, of which eleven inches fall in the five months, May to September, as at Eastbourne), while, in marked contrast, the hills a few miles to the west present sharper outlines and peaks, as a result of a rainfall three times as heavy ; (2) the character of the vegetation. Rhododendrons grow to a large size, and there are many varieties of the less hardy conifers, shrubs and plants. The tree-trunks are noticeably free from lichens

and algae, while their straightness testifies to the non-prevalence of strong winds. The conformation of the ground and character of the soil give efficient natural drainage, moisture leaving the ground rapidly after rain ; while there is an abundant supply of excellent soft water.

The climate is characterized chiefly by an equable temperature, without extremes ; a quantity of bright sunshine, only to be explained (in view of the latitude) by the remarkable transparency and purity of the atmosphere ; a low degree of cloudiness, and a moderate rainfall and relative humidity. Though strong winds are uncommon, ample ventilation by pure air can never be lacking in a country of hills and glens.

The summer has the long days and short nights of the higher latitudes. April, May and June are pleasant months, during which the rainfall and humidity are low, light breezes and calm, sunny weather prevail, and the temperature rises steadily ; June being the pleasantest of the year. The warmest months are July and August, which have frequent periods of perfect summer weather, interspersed with unsettled and showery intervals. In September the temperature begins to fall ; but the weather grows more settled, and the uninterrupted sunshine of the calm days, and the still and cloudless nights, often make the climatic conditions almost ideal. The same may be said, on the whole, of October ; save that its temperature is slightly lower, its days shorter, and one or two night frosts may be looked for.

Waters and Treatment.—Four sulphur springs are employed, which differ chiefly in their varying proportions of sulphur compounds. Their leading characteristics are : first, a high percentage of sulphur, mainly in the form of sulphuretted hydrogen gas, with a smaller proportion of alkaline sulphates and sulphides ; and, secondly, a low percentage of sodium salts, especially of sodium chloride. In this lies the principal difference between the Strathpeffer waters and those of some other spas, where the strongest waters contain some hundreds of grains of salt per gallon. Those of Strathpeffer are, therefore, suitable for the treatment of cases in which (as in gouty and renal conditions) the ingestion of sodium salts, and of sodium chloride especially, is not desirable.

There is also a chalybeate spring, containing iron in the form

of a carbonate, which is held in solution by the excess of free carbonic acid gas.

Subjoined is the analysis of No. 4 water, a typical Strathpeffer spring :—

| | Grains per Gallon. | Parts per Thousand. |
|--------------------------------|-----------------------|------------------------|
| Calcium Carbonate . . . | 12·09 | ·172 |
| Magnesium Carbonate . . . | 8·79 | ·125 |
| „ Sulphate . . . | 38·97 | ·556 |
| „ Chloride . . . | 2·41 | ·034 |
| Sodium Sulphate . . . | 5·81 | ·083 |
| „ Thiosulphate . . . | ·30 | ·004 |
| „ Sulphide . . . | 2·18 | ·031 |
| Silica . . . | ·64 | ·009 |
| Alumina, with traces of iron . | ·82 | ·011 |
| | <hr/> 72·01 | <hr/> 1·024 |

There are 19·03 cubic inches per gallon of H_2S , and 38·43 cubic inches of CO_2 . The specific gravity is 1001·175.

Bath Establishment.—The facilities for treatment, other than by the internal administration of the waters, include a modern and well-equipped Bath Establishment. Among those which it provides are sulphur, brine, iron, pine, vapour, hot air and Nauheim baths; as well as peat baths, which were first employed at Strathpeffer. There are also douche rooms, in which the various forms of douches (local and general) are given by skilled attendants; besides cooling rooms, massage rooms, and a department fitted up with all the apparatus required for the various kinds of electrical treatment, including radiant heat, high frequency and so on. There are further obtainable various accessory methods of treatment, such as the Greville hot air apparatus, and administration of intestinal douches in accordance with the Plombières technique; while in a special department is installed the apparatus for the inhalation of atomized sulphur water—a most valuable method of treatment for chronic and subacute conditions of the respiratory passages.

Indications.—The principal disorders for which a course of Strathpeffer treatment is indicated are: (1) Chronic and subacute gout and rheumatism, especially of joints; (2) the

various manifestations of irregular gout, and the "uric acid diathesis"; (3) subacute and chronic inflammations of fasciæ, connective tissues, muscles and nerves, as, *e.g.* lumbago, sciatica, etc.; (4) rheumatoid arthritis, in its early stages, and osteo-arthritis; (5) chronic skin diseases, such as eczema and psoriasis, especially when associated with gout, and acne; (6) atonic and catarrhal dyspepsia, and the various functional disorders of the liver, particularly those resulting from residence in the tropics; (7) some chronic urinary disorders, as gravel and subacute cystitis; (8) many functional nervous complaints; (9) muco-membranous colitis; (10) chlorosis and secondary anæmia; (11) a heterogeneous class, including chronic metallic poisoning, catarrh of the upper respiratory tract (rhinitis, pharyngitis and laryngitis), certain cardiac conditions, *e.g.* post-influenzal irritability, and excessive arterial tension; (12) specific conditions demanding large doses of iodides. These salts rarely give any trouble when taken with full doses of sulphur water. Such cases, moreover, usually receive benefit from the general régime of the place, and from appropriate baths.

Length of Treatment.—As a rule, the course of treatment at Strathpeffer requires three—sometimes four—weeks, though modifications are naturally to be made in certain cases.

There is no lack in the neighbourhood of suitable places for an "after cure" when considered desirable.

Amusements.—The spa has its gardens, tastefully laid out, and affording pleasant, shady walks; while they contain lawn-tennis courts, croquet grounds and bowling greens. In the gardens, too, are the new Pump Room, and the Pavilion; the latter a large concert hall, to which are attached a reading and writing room, as well as the premises of an excellent social club, which is open to visitors on suitable introduction, and is provided with a restaurant, card rooms and other club rooms. First-rate music is furnished by the spa orchestra, which during the season plays twice daily in the gardens, and gives a concert every evening, except when varied by a dance or other entertainment. There is a very good eighteen-hole golf course about ten minutes' walk from the centre of the village, with a comfortable Club-house; and a beautiful little cricket ground, half a mile distant. The

Highland Games and sheep-dog trials, usually held in August, form an interesting variation from the ordinary amusements. Visitors at some of the hotels can obtain salmon and trout fishing, as well as shooting. Strathpeffer being situated in one of the most beautiful districts of the Highlands, those whose tastes lie in walking, driving or motoring will find full scope for their gratification. Well-kept paths have been laid out in the pine-woods above the Spa, with easy gradients and frequent seats. Daily coach drives form a time-honoured resource among visitors. Motor-cars may be hired for any period, at reasonable prices; and there is ample garage for those who bring their own.

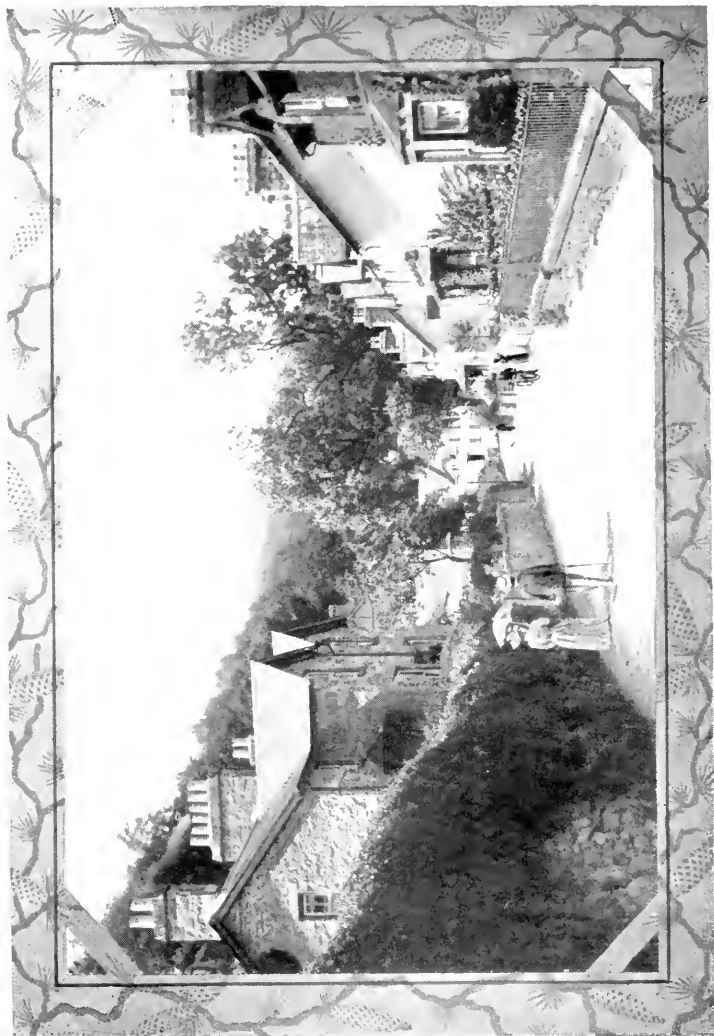
Accommodation.—There is accommodation for all classes of visitors: four large hotels, several smaller ones, and a large number of boarding and lodging-houses. The houses are built of stone, and the majority of them have electric light.

Contributed by a Medical Committee at Strathpeffer.

Strathpeffer, Ross-shire. Height above sea-level, 250 feet. Season, from May until the third week in October. Chief season from mid-July to mid-September. Churches: Established, Episcopal, United Free, Free. Distance from London, 591 miles. Time of journey, $14\frac{1}{2}$ hours. Chief expresses leave London about 8 p.m. Travel by night avoided by breaking journey at Perth or Edinburgh.

Further information obtained on application to the Spa Management.

Hotels.—Ben Wyvis Hotel; Balmoral Hotel; Highland Hotel; Spa Hotel.



TREFFW VILLAGE.

[To face p. 111.]

TREFRIW SPA, WALES.

Mineral Waters : Strong Chalybeate.

TREFRIW is situated on the Carnarvonshire side of the Conway river, about nine miles by road from Conway. The village, picturesque in itself, lies in a charming valley, amid scenery of great and varied beauty. The neighbouring hills on the Carnarvonshire side are richly wooded with pine, oak and beech, in contrast to the cultivated uplands opposite. From the hills may be traced the course of the river, winding through the fertile meadow-lands of the valley to the sea; while, in the other direction, the mountains of the Snowdon range are descried. Llyn Crafnant, one of several lakes in the mountains above Trefriw, is within easy reach, and its beauty well repays a visit.

The houses in the village are well built, and are pleasantly situated on the main road and the higher ground.

Climate.—The climate is mild, and a combination of sea and mountain air. The river is tidal as far as Trefriw. The higher levels afford a pure and invigorating atmosphere.

The Wells.—The medicinal springs are about a mile from the village. During recent years the Pump Room has been re-arranged and fitted throughout with a special installation of pipes and baths which neither affect, nor are affected by, the natural properties of the waters. These change rapidly on exposure to light and air; hence they are now supplied, for use at home, in non-actinic bottles, carefully corked and hermetically sealed, in which the water remains in its natural state for an indefinite time.

The waters are of the sulphur chalybeate class, and are so strong that, at the beginning of the course, only small doses are taken. They have a pleasant, astringent taste, are devoid of any disagreeable odour, and are cold and refreshing.

The springs are two, supplying respectively the waters known as No. 1, Strong Iron, and No. 2, Sulphur, or Mild Iron, Water.

Analyses.—The analyses of these are as follows :—

Appearance.—Bright and clear.

| | No. 1. | No. 2. |
|-------------------|----------------|----------------|
| Reaction . . . | Strongly acid. | Strongly acid. |
| Temperature . . . | 48° F. | 50° F. |

| | No. 1. | | No. 2. | |
|---------------------------|--------------------|---------------------|--------------------|---------------------|
| | Grains per Gallon. | Parts per Thousand. | Grains per Gallon. | Parts per Thousand. |
| Protosulphate of Iron . . | 381·80 | 5·454 | 171·25 | 2·446 |
| Sulphate of Alumina . . | 49·05 | ·7 | 33·96 | ·485 |
| „ Magnesia . . | 15·90 | ·227 | 20·82 | ·297 |
| „ Soda . . | 3·29 | ·047 | 5·45 | ·077 |
| „ Lime . . | 26·32 | ·376 | 32·28 | ·461 |
| Chloride of Calcium . . | 1·18 | ·016 | ·82 | ·011 |
| Silica . . | 10·43 | ·134 | 11·74 | ·167 |
| Manganese, and loss . . | ·16 | ·002 | ·11 | ·001 |
| | 488·13 | 6·954 | 276·43 | 3·945 |

There is no persulphate of iron in either of the waters when first submitted to examination, but a small quantity is formed on exposure.

The composition of the waters remains virtually constant. The above analyses show them to be very rich in iron and other mineral constituents. The iron, being in the form of protosulphate, is of special medicinal value.

Mode of Treatment.—The course should cover about six weeks, treatment being begun preferably with the No. 2, or mild water. Half an ounce may be taken, during the first week, two or three times a day, about an hour after meals. During the second week this dose may be doubled. For the third week, the No. 1 water should be administered in half-ounce doses, rising to ounce doses during the fourth week. These may be continued for the fifth and sixth weeks, according to the requirements of the case. In some cases it may be desirable that only the mild water, in others that only the strong, should be taken throughout. In more prolonged courses even larger doses may be given with advantage; and the course may extend for three months. After an interval of a week or two a second course may be entered upon; while the waters bottled

at the spring are so well preserved that further courses may be carried out at home. During the first period of administration, at about the seventh to tenth day, some patients experience slight alimentary disturbance. This quickly passes off, however, and is followed by a sense of well-being which continues and gradually increases.

The Baths.—An agreeable feature of the Trefriw bath is its simplicity. The patient reclines in an ordinary house bath of large size. The water, before it enters, is heated to about 103° F., and gradually cools down as the patient rests in the bath for five, seven, ten or fifteen minutes, as may be. During and after bathing a delightful feeling of comfort is experienced, followed by one of exhilaration. At first a clear amber colour, and quite transparent, the water changes in the course of three or four minutes, and gradually becomes turbid, while there is a deposit of iron to the bottom.

In addition to the ordinary bath, other kinds, such as the sitz, foot, wave and douche may be had when required.

Therapeutical Uses.—The value of the water is especially evident in anæmia—primary or secondary—except pernicious anæmia; and is due not to the iron alone, but also to the presence of calcium and sulphur. The accompaniments, too, of anæmia are indirectly benefited. In conditions where the health has been lowered by overwork, or in exhaustion following recent illness, the waters are very serviceable. They have a remarkable effect on post-malarial cachexia. In disorders of digestion, gastritis and colitis, their use is most advantageous; while in carcinoma ventriculi they tend not only to counteract the cachexia, but often have a beneficial effect upon the gastric symptoms. The arthritides are favourably influenced—especially rheumatoid arthritis, gouty conditions and rickets. In the neuroses associated with general debility, as well as those of neurasthenic and hysterical type, the waters form a great adjunct to treatment.

Exophthalmic goitre is beneficially influenced, and I have seen very severe cases cured after a prolonged course. It is stated that the waters act as a specific in cases of chronic lead or mercurial poisoning.

The waters and baths are of great value in neuritis and neuralgias.

Children and adults with tuberculous lesions of glands, bones, etc., and incipient phthisis, should derive much benefit from the waters.

The waters of Trefriw, in fact, and the district itself as a health resort, deserve to be better known to the medical profession than they are at present.

Amusements.—There is a well-appointed recreation ground, with lawn-tennis courts, croquet lawns and bowling greens. At both Trefriw and Llanrwst there are good golf links. The river Conway affords good trout and salmon fishing, and trout fishing may also be had on Llyn Crafnant and Cowlyd in the early season. On the former lake there are boats for hire. Pleasure steamers ply on the Conway between Trefriw and Deganwy, a charming sail of fourteen miles. The Buckley Otter Hounds meet occasionally in the autumn and afford interest to visitors. In the immediate neighbourhood are many places of interest and beauty.

Accommodation.—Excellent accommodation for visitors is to be had, both at Trefriw and at Llanrwst, at each of which there are hotels, as well as houses in which rooms and board may be obtained on reasonable terms.

R. J. M. BUCHANAN, M.D., F.R.C.P.

Trefriw, Carnarvonshire. Population, 700. Height above sea-level, from a few feet, up to about 300. Season, open all the year round. Chief season, from April to October inclusive.

Distance from London, 230 miles. (Station at Llanrwst.) Time of journey, 5 hours.

Hotel.—Belle Vue (at Trefriw).



[To face p. 115.]

WOODHALL SPA, THE SPA BATHS AND PUMP ROOM.

Although it is used as mineral water
there is no evidence to indicate
its value

Dr Williams is of the
family

Dr Bogo. would it were
an

WOODHALL SPA.

Mineral Waters : Strong muriated, bromo-iodine.

SITUATED about twenty miles from the sea coast, between the Fens and the Wolds, and midway between Lincoln and Boston, this place has come into prominence as a spa during the last ten years.

History.—The history of its development as a spa is not without interest. The mineral water was discovered in 1811, while a shaft was being sunk in search of coal. No coal was found, but, at a depth of 510 feet salt water flooded the shaft, and eventually overflowed into a neighbouring brook. Some of the inhabitants thereupon experimented with the water as a remedy for their rheumatism and gout, and found great relief from its use. The owner of the land, convinced by expert analysis of the remarkable properties of the water, in 1834 built a bath house, and in the next year added the adjoining hotel. For some years these, with a few other houses, constituted the spa, which, from this modest origin, has now developed into an attractive residential town of 1,450 inhabitants, and double that number during the season.

The Mineral Waters.—These are obtained from two wells, situated about a quarter of a mile apart. The original (1811) well supplies the Spa baths and Pump Room, and the new well, sunk in 1904, the Royal Hotel baths.

The waters from these two sources are very similar in character. The inferior oolite stratum from which they both probably originate is a porous sandy rock, some eighteen feet in thickness, lying at a depth of 515 feet below the surface of the ground, beneath a thick layer of Kinneridge and other clays. As this stratum extends laterally for probably some miles, the supply is practically inexhaustible.

Owing to its special interest to chemists and others, the water of the original well has been the subject of many analyses, the most recent of which is here appended.

ANALYSIS OF THE ORIGINAL WELL MINERAL WATER IN 1911,
BY SIR T. E. THORPE, F.R.S.

Specific Gravity, 1·01635 at 64·2° F.

| | Grains per Gallon. | Parts per Thousand. |
|----------------------------------|-----------------------|------------------------|
| Potassium Iodide | ·5377 | ·00768 |
| „ Bromide | 3·5133 | ·05019 |
| „ Chloride | 1·3573 | ·01939 |
| Sodium Chloride | 1406·1040 | 20·0872 |
| Magnesium Sulphate | 5·9150 | ·0845 |
| „ Chloride | 38·3960 | ·5528 |
| Calcium Chloride | 105·5950 | 1·5085 |
| Silica | ·6860 | ·0098 |
| Iron Oxide and Alumina | ·3740 | ·0053 |
| | <hr/> 1562·4783 | <hr/> 22·3254 |

It has a strongly salt, but not otherwise unpleasant taste. In natural temperature it is about 63° F.

Investigations are being made as to the strength of the radio-activity which there is good reason to believe this water possesses.

The following is the analysis of the NEW WELL WATER by S. R. TROTMAN, F.C.S., in 1908 :—

| | Grains per Gallon. |
|------------------------------|-----------------------|
| Sodium Chloride | 1029·45 |
| „ Carbonate | 3·15 |
| Calcium Chloride | 235·98 |
| „ Carbonate | 12·25 |
| Magnesium Sulphate | 80·51 |
| Sodium Sulphate | 89·36 |
| Free Iodine | ·25 |
| Iodine as Iodide | ·83 |
| „ Iodate | ·58 |
| Bromine as Bromide | 3·92 |
| Silica | 1·96 |
| Iron Oxide | 1·33 |

Total mineral matter 1459·57,
making parts per thousand, 20·851.

Comparison of Woodhall Spa Water with others of the same Class.—Woodhall Spa water should not be brought into comparison with the very strong brines found at Droitwich, Rheinfelden, Salies-de-Béarn and such places—brines which are sometimes diluted even for external use. It belongs, rather, to the group of waters represented at Kreuznach, Bourbonne-les-Bains and Hall (Austria) — iodo-bromated waters which may be taken internally without dilution.

As at many other spas, a saturated solution, known as motherlye, is made by condensation from the mineral water. It is used for strengthening the baths, for compresses, and for other external applications.

Internal Administration and Therapeutic Action.—The drinking of the water excites the action of the gastric mucous membrane and increases the secretions of the intestinal canal. Thus, a full dose (10 oz.), containing about 100 grains of salts, taken hot, before breakfast, usually acts as a purgative. Small doses produce a sedative action upon the intestines, useful in irritable and catarrhal states of the mucous membrane.

The most important action, however, of the internal administration of this water is that it causes the absorption of inflammatory effusions and deposits, whether associated with joints, nerves, glands and lymphatic vessels, or blood vessels, or with catarrh of the mucous membranes. For this purpose the water must be given in varying doses, ranging from small ones up to a maximum of about 30 oz. per diem. It is usually taken three times a day, at least half an hour before food. Its effect upon the vascular system is to lower arterial tension; but it improves anæmia and other impoverished conditions of the blood.

It possesses in certain doses the power of increasing the excretion of urine, both in regard to its solid content and aqueous total per diem.

The external action of this water has a beneficial effect upon the skin, in restoring it to its normal smooth and supple condition. It probably acts as a disinfectant, while it powerfully stimulates the skin's nutrition.

It has also a remarkable restorative effect upon the mucous membranes of the nose and throat, and those of the vagina and endometrium.

Indications for the use of the Water.—The most striking effect of the water when taken internally being to cause absorption of inflammatory conditions and deposits, it is obviously indicated in cases of rheumatism, especially after rheumatic fever, acute and subacute, in the chronic forms of both articular and muscular rheumatism, where pains and stiffness linger and in gonorrhœal rheumatism. A course of the water, with appropriately administered baths, has been shown by observation to be beneficial in osteo-arthritis deformans, chronic gouty arthritis, injuries (such as sprains of the joints) and synovitis. It has proved useful, too, in the various forms of neuritis—as the brachial, sciatic, intercostal and cervical; in skin diseases, especially dry eczema, psoriasis, urticaria, lichen and acne; as well as in catarrhal and inflammatory diseases of the mucous membranes, chronic rhinitis with much thickening, follicular pharyngitis, and deafness associated with inflammatory affection of the posterior nares. To these may be added chronic inflammatory conditions of the intestinal mucous membrane, mucous colitis, and—in diseases of women—vaginitis endocervicitis and metritis, and sterility. In cases of fibroma uteri, particularly, the baths and douches arrest hæmorrhage and reduce the size of the tumours, with great relief to pressure symptoms.

The water is valuable in rickets and in scrofula; in enlargement of the tonsils, and in simple forms of goitre. It has also proved beneficial in thickening of the veins due to phlebitis, and in lymphatic stasis.

Contra-Indications.—Contra-indications are emphysema, pulmonary tuberculosis, advanced heart disease, renal disease, and malignant diseases.

Duration of the Course.—A course of from three to four weeks, which allows of an average maximum of eighteen to twenty-one baths in succession, is all that is advisable at one time, for the majority of cases. An immediate cure must not be looked for from one such course. The nutritional changes which it initiates must be given time to develop fully. When necessary, it is well to repeat the treatment after an interval of a few months.

The Bath Establishments.—Of these there are two; the Spa Baths, which have recently been enlarged and improved, and

the Royal Hotel Baths. In both, the mineral water is employed for baths, douches of several kinds, eye and throat sprays, and nasal douches.

The Spa Baths are well equipped with accessory appliances, by means of which various other treatments can be given, either independently of the water or as supplementary to its use. They include Nauheim, pine, sulphur, and brine baths; Aix and the Vichy douche-massage, Dowsing radiant heat, electric light, Berthollet vapour, and Russian baths; as well as several other forms of electrical treatment. In all, some thirty-six different treatments are obtainable. These baths adjoin the Victoria Hotel.

The baths of the Royal Hotel (connected with it by a covered way) are also well equipped. The auxiliary installation is on a smaller scale.

In addition, Woodhall Spa possesses a private laboratory—in which various serum and vaccine treatments are carried out—the Alexandra Hospital, for mineral water treatment, and the Gentlemen's Home.

Season.—The Spa Baths are open from the beginning of April until the beginning of November, while those of the Royal Hotel remain open during the winter also.

Woodhall Spa as a Health Resort.—Woodhall has so far been dealt with here as a mineral spa, but its topographical and climatic features give it certain advantages also as a health resort. Built exclusively as a spa, it lies in a thinly populated part of the country. It has the further good fortune of being situated upon the least humid side of England, its rainfall rarely exceeding twenty-three inches and sometimes amounting to only sixteen inches for the year. The town is bounded on the north and east by a long stretch of rising ground covered with pine-woods, so that, without being too much shut in, it is fairly well sheltered from cold winds. The spa stands upon what was formerly open, heather-clad moorland, with, beneath it, a depth of from three to sixteen feet of gravel. Hence, although on the border of the Fens, its subsoil dries very quickly. Notwithstanding the flat character of the surrounding country, the place has natural beauties which have been retained unimpaired in the laying out of the spa.

These features make Woodhall Spa and its neighbourhood

particularly suitable for invalids with cardiac trouble, as well as for persons past middle life who need only change of air and pleasant recreation. Children, too, thrive in this invigorating moorland air. The coldest time of the year at Woodhall is from the middle of January to the end of March. From the beginning of May until the end of October, however, the weather may be described as better than the average, in such a changeable climate as that of England.

Recreations.—Dances and theatrical and musical entertainments are provided during the height of the season. An orchestra plays twice daily in the spa grounds.

For golfers there is a fine inland course of eighteen holes, on the moorlands which stretch out from the spa grounds. It is dry all the year round, while the air is bracing and invigorating.

There are four or five tennis courts and croquet lawns in the grounds of the hotels, as well as at the Sports Club. There is a good cricket ground. Fêtes, sports, gymkhanas and tournaments take place at intervals during the season.

Excursions may be made to the following places of interest in the neighbourhood: Blankney Park, Boston "Stump," Kirkstead Chapel and Abbey, Lincoln Cathedral, Revesby Abbey, Scrivelsby, Somersby (Tennyson's birthplace), Tattershall Castle and Church and others.

Accommodation.—There are several comfortable hotels and boarding-houses, and a number of good apartments.

L. C. E. C.

Woodhall Spa, Lincolnshire. Population, 1,450. Height above sea-level, 40 feet. Distance from London, 123 miles. Time of journey, 2 hours 50 minutes. Sunshine per annum not recorded. Annual rainfall, 22 inches.

Mean temperatures.—January, 34·75°; February, 37·95°; March, 40·06°; April, 45·30°; May, 54·15°; June, 57·99°; July, 61·32°; August, 60·48°; September, 54·69°; October, 49·61°; November, 39·89°; December, 38·63°.

Open all the year round. Chief season, April to November.

Hotels.—Victoria; Royal; Eagle Lodge; Goring; Clevedon Golf.



WOODHALL SPA, CHURCH WALK.

[To face p. 121.]

HYDROPATHIC ESTABLISHMENTS

AND

INSTITUTIONAL TREATMENT.

IN itself by no means a happy wedding of derivatives, "hydropathic" is a term to which there has long attached a certain amount of odium—in the minds of members of our own profession, especially. It may have been the result, originally, of an impression of anti-climax. So much was claimed for the "cold water cure" at its inception, that an ingenuous public was led to regard it as a panacea, and, with the disappointment of excessive hopes, came the inevitable reaction, when equally excessive ridicule was poured upon the whole system.

In the early days of the hydropathic movement, a number of large establishments were erected, with a view, for the most part, to serious treatment. A later development was the rise of a class of institutions which, though adhering to the name of "hydros," were, strictly speaking, little more than large unlicensed hotels or boarding-houses, moderate in their prices, but not of the first rank in the matter of accommodation. Lacking, as a rule, anything in the way of hydrotherapeutic appliances beyond, possibly, hot air chambers, they relied largely upon the provision of amusements for their visitors, in season and out. While they have undoubtedly popularized the title of "hydro," it cannot be said that such places have enhanced its dignity from the point of view of serious treatment.

Institutions of both types still survive. The genuine hydrotherapeutic establishments have been much improved in equipment; while some of the later, or "hotel" class, are well situated, well built and conspicuously well managed. There

are also, between these two types, a few establishments of an intermediate character.

We have nothing in our country corresponding to the great German "Kuranstalten": institutions which are, in truth, *general* sanatoria, where a judicious use of hydrotherapy is combined with a wide diversity of other measures; anything, from quinine to psychotherapy, being pressed into the service of the patient, so eclectic is the spirit which guides their policy. Our lack of any institutions of the sort amounts to a serious weakness in our therapeutic armament, but whether success would attend the attempt to introduce one here on an adequate scale may be considered more than doubtful at the present stage of medical opinion—dare one say prejudice—in the British Isles.

To these "Kuranstalten" the nearest approach we can boast—though still a long way off—is in our hydros of the best type. Although, even in these, business considerations necessitate the reception of ordinary guests as well as of invalids, that arrangement is not without its compensating advantages to the invalids themselves. It allows them, for one thing, the companionship of relations or friends, while the admixture of a proportion of healthy visitors tends to prevent the atmosphere from becoming oppressive with invalidism. It involves the drawback, however, of increasing the difficulty of discipline in cases which require that it should be strictly maintained.

It is beyond the scope of this article to discuss the advantages of spas, whether British or foreign, for different categories of patients. Instead, it is more to the present purpose to point out that among the invalids requiring change from home surroundings, there are many who should not be sent to any ordinary hotel or apartment house, even at a spa or climatic station. This is a matter depending for decision upon the existence, or the degree, of mental and physical incapacities in the patient, which medical men should duly take into account. To the point is a striking instance of such mental incapacity I recently met with in the case of an old gentleman suffering from gouty eczema, who had been advised to go to a well-known spa, but happened to come to me first. So completely was his memory in abeyance that, even within

the comparatively limited confines of the establishment to which I am attached, he was for ever losing his way—or his hat! Is it not obvious that the amenities of spa life would have been confusing, rather than either enjoyable or beneficial to such a patient? In a hydro he soon found his appropriate niche.

A serious drawback at most spas is that patients are obliged to go out for their baths. This entails not only extra fatigue in dressing and undressing, but also the manifest risk of catching cold after immersion in hot water. At any well-planned hydro, getting from bed to bath and back again is a matter only of a few paces and a seat in the lift.

Not least among the advantages to be claimed for a hydro is the peculiar facilities an institution of the kind affords the physician for gathering information as to the habits and temperament of the invalid. Not only is he in close personal touch with his patient, but hints from nurses, attendants, and sometimes from fellow-visitors may often furnish side-lights on the case, elsewhere not easily obtainable. Especially in cases of mental depression may the knowledge so acquired prove to be invaluable.

The hydro has thus its distinct and special province. It holds a place midway between the nursing home and the spa, while, properly, competing with neither. It is typically suitable for patients after they have ceased to require the confinement and the rigid discipline of a nursing home. By rendering possible to greatly enfeebled patients the application of intensive balneary treatment, it offers benefits which but very few spas can provide.

For those who are not inclined to mix freely with the strangers, or to seek pleasure among the crowds of a large resort, the hydro presents amusements less far to seek, less pretentious, and more easily escaped from in case of fatigue.

It would be a task at once difficult and invidious to pick out from the numerous hydros those which are best equipped for balneary treatment. Those best known to me, besides the institution ^{at Leek} to which I am attached, are: at Malvern, Dr. Ferguson's; at Matlock, Smedley's, Roekside, and Matlock House; at Wemyss Bay, Philp's Hydro.

T. D. L.

Among other institutions adequately equipped and under proper supervision are :—

At Bridge of Allan, The Hydropathic Establishment; at Bute, the Kyles of Bute Hydropathic; at Crieff, Streatham House; at Forres, Cluny Hill Hydropathic; at Grange-over-Sands, Hazelwood Hydropathic; at Ilkley, Craiglands Hydropathic; at Moffat, the Moffat Hydropathic; at Rothesay, Glenburn Hydropathic; at Southport, Kenworthy's Hydropathic.

THE PRACTICE OF HYDROTHERAPY : MINERAL WATER AND SEA BATHING CHARITIES.

THE term "hydrotherapy" may be held to include all methods of employing water in the treatment of disease, but in this article it will denote that aspect of medical hydrology pertaining to the external application of ordinary water; and chronic conditions alone will be dealt with.

Hydrotherapy is one of the most ancient methods of treatment, and from the time of Hippocrates has never passed out of use. To Floyer, an English physician of the seventeenth century, is due the credit of initiating its modern and scientific practice. His work has been developed for the most part by German physicians; though Priessnitz, a Silesian peasant, by the remarkable cures which he obtained, was the first to attract public notice to hydrotherapeutic methods. The simplicity of his procedures led to their being largely exploited by laymen, and this, in England, has perhaps militated against hydrotherapy with the medical profession. With us, indeed, the work of the early medical investigators in this branch of physiotherapy has been—to our own loss—in a great degree forgotten. Our medical schools have ignored it; text-book references to it are, for the most part, so vague as to be of no practical value, and, save at the spas, the use of water as a remedial agent has remained to a great extent in the hands of empirics. Hence, doctors have not been educated to determine what cases are most likely to benefit from hydrotherapeutic treatment; while patients have been accepted at water cure establishments without due discrimination, and their treatment has been, too often, devoid of scientific direction. True, many of them have derived benefit; but on the other side of the ledger must be entered numerous failures, not to speak of calamities. However the balance be struck, such conditions are not conducive to scientific progress, and the confidence of the profession has not yet been fully gained.

Thus, in the country where the regeneration of hydrotherapy was initiated, a volume, the chief aim of which is to assist in the choice of a spa or other health resort, must also offer evidence of the right to recognition of a science possessing curative resources for which in many instances, there is no satisfactory substitute.

Very different is the state of things abroad. In Germany no less than twenty universities provide systematic courses of instruction in medical hydrology; while in France, Switzerland, Austria, Bohemia, Hungary, Italy and the United States, the science receives academic as well as popular recognition. In one American city, the members of the medical staff of a general hospital have, at their own expense, equipped one of its floors with a complete installation of baths.

In England there is one ray of hope. Some of the shrewdest members of the community lead the way, where the medical profession still hesitates to follow. Boards of Guardians and practical philanthropists appreciate the benefits accruing from, at any rate, mineral water and sea water treatment. They recognize that the period of disability from certain maladies in the group of invalids with whom they have to deal is notably shortened by this means; and they evidence that recognition in the most practical manner, by subscribing to institutions which provide such treatment on a charitable basis.

For the convenience of those of our profession who desire the poorer among their patients to benefit by such treatment, there will be found at the end of this article a list of these charitable institutions, as complete as I have been able to make it. Consideration of the results obtained at these places should not only do much to dispel doubt as to the reality of the benefits received from hydriatic procedures, but may stand as a refutation of the ill-informed statement recently made in a medical journal, that hydrotherapy is now merely the luxury of the rich.

To come, then, to the practical application of hydrotherapy; a great variety of methods are in vogue, but the principles involved are the same throughout. Water externally applied acts upon the nervous and vascular structures of the skin—an organ which is affected by two principal forms of stimulus—

mechanical and thermic. Mechanical stimuli are produced by the impact of sprays and douches, and by the friction or massage which is an essential feature of many baths; while thermic stimuli are set up by the temperature of the water used in the various procedures.

It must not be forgotten how large a proportion of the blood may be contained in the capillaries of the skin: a proportion capable of great variation under the influence of stimuli acting through the muscular coats of the arterioles. It is upon the nerve supply of the skin that we depend for heat regulation, as well as for maintenance of the tone of the cutaneous vessels, which is a factor of great importance in the general circulation. Woods Hutchinson considers that this capillary network possesses the power of rhythmic contraction, and that such contractions materially assist the heart. The effect of brief cold baths is, in the first place, contraction of the capillaries of the skin, and then, under the influence of reaction, a corresponding dilatation, which, by aiding circulation, produces a sense of well being. The experiments of Vinaj and Maggiori illustrate other effects. They found that brief immersion in a cold bath (50° F.), increased the capacity for muscular work 50 per cent.; several minutes in a warm bath, gradually cooled from 97° to 68° F., more than doubled it; while the application of a cold wet sheet, with rubbing, restored full capacity to fatigued muscles. Other observers have demonstrated that the effect of a course of baths is to increase nitrogen metabolism and excretion; but a single bath has little or no effect in this direction.

Hydrotherapeutic methods thus act upon the circulation in the cutaneous vessels, regulating the body heat; upon the circulation in the muscles, increasing their capacity for work and removing fatigue products; upon the circulation in the nervous system, improving the capacity for mental work, and upon the circulation in the viscera, relieving congestion. The heart is assisted in its action, the excretory powers of the skin are improved, and metabolism in general is profoundly influenced by methods which are susceptible of perfect control and adaptation to the needs of the patient.

While, as demonstrated in the bathing establishments of Paris, Berlin and New York, not to cite other cities abroad,

hydrotherapy may undoubtedly be practised with success in large towns, it is there subject to the drawback that town life is not conducive to that strict attention to regimen which is, in so many cases, essential; while city air is never of the purest. Hence, in comparison, the special value of those health resorts which offer, in addition to first-rate balneary equipment, advantages in climate, surroundings and general hygiene.

This article would scarcely fulfil its purpose without some brief description of the technique of various hydriatic methods.

Of these, packs are the mildest, and may be either general or local; the latter being often called compresses. The principal general methods are (1) the drip sheet, and (2) the wet pack. The effect of the first, for periods of three to five minutes, is tonic and stimulating; if continued longer it has a sedative and antipyretic influence. The patient stands in a tub of warm water, enveloped in a sheet dripping with water at a temperature of 70° to 80° F., and is splashed with water at the same temperature, while friction is applied through the sheet. He is then dried by brisk rubbing, and may either take a walk, or rest, according to the end in view. This method is of value in the curable anæmias, neurasthenia, melancholia, and all conditions in which a stimulating and invigorating effect is required.

To administer the wet pack, a couch is prepared by spreading over it one or more blankets. On this is laid a sheet, wrung as dry as possible out of water at about 75° to 85° F., and this is wrapped closely round the patient. The blankets are then also folded round him. Hot water bottles are placed near him if his reactive powers are weak. The duration of the pack may extend to an hour. It is generally followed by a needle bath. The wet pack is sedative to a marked degree; it relaxes the cutaneous circulation, and its success depends largely upon the patient's powers of reaction. It is of great value in irritable conditions, such as delirium and mania; and also in those forms of neurasthenia and hysteria in which restlessness and insomnia predominate.

Local packs are in common use, especially in the form of the throat compress. They are very beneficial in congestive conditions of the abdominal viscera. The peat or mud packs, which are more used at spas, and the mustard packs in

hydrotherapeutic establishments, are designed to act in the same way as the simpler packs, but are more potent as cutaneous stimulants.

Baths may be full or partial, cold or hot, and may be further modified by the use of friction or massage while the patient is immersed. They form the principal method of applying mineral waters externally, and need not be described in detail.

The full cold bath—other than in mineral water—is chiefly used as an antipyretic measure. The term cold is used in a relative sense, the range of temperature included in the term being from 65° to 75° F.

The warm full bath is sedative, and reduces visceral congestion by drawing blood to the surface. With it may be combined douching of the neck and spine by pouring cold water from a jug, which makes it more tonic in effect. It is of value in sleeplessness, arterio-sclerosis, and chronic rheumatic conditions, while it is also said to be of use in chronic alcoholism.

The Japanese use hot baths to an extraordinary extent, in Tokio as many as 400,000 being given in one day. They take them at a temperature higher than can be borne by other races—about 130° F.—and the effect is said to be to remove muscular fatigue in a remarkable manner. A cold affusion is often given after the bath and enhances the effect.

The hot sitz bath reduces visceral, and especially pelvic congestion; it is useful in menstrual disorders, ovarian neuralgia, chronic pelvic inflammation, tenesmus, congested stricture, etc. The bath may be continued for an hour, if the temperature of the water be maintained. Cold sitz baths are tonic and, in suitable cases, anodyne; they should be brief, and friction should be kept up all the time. They are commonly used in atonic conditions of the pelvic organs, and are of value also in intestinal torpor.

The hot foot bath (an ordinary household remedy) has a derivative effect in congestive headaches and in other conditions; while the cold foot bath, of brief duration and followed by friction, is useful for cold feet—a very common cause of insomnia.

Douches are of supreme importance to the hydrotherapist, and are used either alone or in combination with massage or with other baths. A great variety of douches have been

devised, but all have the same object; that of mechanical stimulation or thermic massage.

The circular douche, or needle bath, is well known. The impinging of the numerous jets of water on the whole surface of the body has a very stimulating effect. This douche is frequently used after other baths and packs, to assist reaction, or to tone up relaxed cutaneous vessels. Both temperature and pressure should be prescribed. It is a most useful tonic to those living sedentary lives, to neurasthenics and hypochondriacs, and in some forms of dyspepsia.

The rain douche, or shower bath, is also familiar, and its range of usefulness is much the same as that of the circular douche.

A jet douche is a stream of water issuing from a nozzle (usually of quarter to half inch diameter), and under pressure which is susceptible of regulation. In the simple form, the douche is played upon the patient from a distance of six to ten feet. The Scotch douche is applied in the same way, but its special feature is that the temperature of the water is subjected to rapid alternations. The range of temperature is from 65° to 105° F., and the duration of each alternation is from two or three to twenty seconds, or longer. The change must be suddenly made, and the hot phase should be more prolonged than the cold. It is one of the most tonic and stimulating of all hydropathic procedures.

In the Aix system of douche-massage, the attendant has the douche-pipe over his shoulder and keeps it directed upon the part he is massaging. In the Vichy douche-massage, sprays of water fall upon the recumbent patient. In the Buxton system the patient, instead of sitting or reclining on a hard chair or bench, lies in a shallow bath in water which partially covers the body, so that muscular relaxation is obtained. These methods are of great value in chronic rheumatism, chronic gout, and all conditions where the promotion of circulation and the absorption of inflammatory products is aimed at.

The underwater douche is given while the patient is immersed in a bath at a temperature of 92° to 96° F., that of the submerged douche being much hotter. This method is useful in dealing with stiffened joints arising from rheumatism; in the

various forms of arthritis; in lumbago and sciatica; in visceral neuralgia, and also as a general sedative.

The Turkish bath, while not strictly one of the hydrotherapeutic procedures, is closely associated with them. Its distinctive feature is the induction of perspiration by exposure to hot air at 110° to 200° F. This is followed by soaping and massage; after which a cold douche is given, with a rain douche or plunge, at option. Its effects are cleansing and refreshing, while it stimulates the circulation and aids the elimination of waste products. It is much used by those unable or unwilling to take sufficient exercise.

Electric light baths are used with a similar object, electric lamps providing the heat.

The Russian bath is similar, steam vapour being used instead of dry air, and the temperature as a consequence being lower, 112° to 120° F. The shampooing process is often omitted. A primitive form in use in Finland demonstrates the reactive capacity of the skin in a remarkable manner; water is poured upon heated stones, and, after remaining in the vapour thus produced for a suitable time, the Finns rush out dripping with perspiration, and roll in the snow to produce a vigorous reaction.

The vapour, or Berthollet, bath, consists of a cupboard filled with vapour at a temperature of 106° to 120° F., in which the patient sits, his head outside. It is followed by a douche or immersion bath. Its effect is diaphoretic, and it is often given to enhance the reactive power of the patient before a cold douche. Half baths or local baths for the limbs are used for those not strong enough to bear the complete bath.

The procedures described above are those most commonly used, but they serve to illustrate sufficiently the principles involved.

In the preparation of this article information has been derived from many sources—notably Baruch's exhaustive treatise (*Principles and Practice of Hydrotherapy*, 1900); while other authors consulted are Dr. Fortescue Fox (*Hyde Memorial Lectures*, 1911), Dr. Neville Wood (*Spa Treatment*, 1910), and Dr. Guy Hinsdale (art. "Hydrotherapy," in Musser & Kelly's *Practical Treatment*).

CHARITABLE BATHING INSTITUTIONS.

The Charitable Bathing Institutions of this country are, as has already been said, a striking testimony to the esteem in which the use of water in disease is held by a section of the community. Mineral water charities are to be found at all the leading spas, sea bathing charities exist at Margate and Scarborough, while a hospital for hydrotherapy pure and simple is available for the comparatively poor at Southport.

MINERAL WATER CHARITIES.

Bath.—Bellott's Hospital. Founded 1610, for ten poor patients suffering from ailments likely to benefit from the use of the waters. Admission is by medical certificate of suitability, and a general certificate as to respectability and means of patient.

Royal Mineral Water Hospital. Founded in 1737. Present accommodation for 83 men and 67 women. About 1,200 patients treated every year, and since 1742, 87,760 patients have passed through the wards, of whom 83 per cent. were either cured or relieved. No subscriber's recommendation is needed. The case must, however, be a suitable one and too poor to obtain the benefits of the Bath waters without such charitable assistance as the hospital affords. There are no out-patients.

Buxton.—Devonshire Hospital and Buxton Bath Charity. The earliest record of this charity dates from 1572, at which time there appears to have been a fund called "The Treasury of the Bath" to minister to the pecuniary necessities of those who needed it. Gratuitous mineral water baths appear to have been provided from time immemorial. The provision of a free supply of the mineral water for drinking purposes is now secured independently of the charity by an Act of Parliament. A regular report of the administration of this Charity was made from 1785 to 1859, at which date the Hospital was established. Besides the provision made by the Hospital for the treatment of in-patients, the Charity continues to provide free use of the mineral waters for bathing purposes for out-patients in less necessitous circumstances. There are 300 beds in the hospital, and the number of in-

patients treated per annum exceeds 3,000. Since 1820 there have been 157,130 patients treated by the charity, of whom 132,832 have been relieved or cured. Admission is by subscriber's recommendation.

Droitwich.—St. John's Brine Bath Hospital. This hospital was established in 1877, and the present building erected in 1892. There is accommodation for 24 men and 17 women. In 1910 there were 630 patients treated, and "the greater portion responded satisfactorily to treatment." Admission is by subscriber's ticket and a payment of five shillings per week is required.

Harrogate.—Royal Bath Hospital. This hospital was founded in 1824, and the number of patients admitted during 1910 was 1,200. The hospital is open from March to November and admission is by subscriber's ticket.

Leamington.—At the General Hospital there is a provision for the treatment of patients by means of the mineral waters of the spa. It is expected that in the near future this department will undergo considerable extension.

Llandrindod Wells.—Hospital and Convalescent Home. There are 22 beds but only a proportion are used for patients sent for the special mineral water treatment. The number of such cases in 1910 was 62. Admission is by subscriber's letter of recommendation, and a payment of five shillings per week is required from patients outside the district.

Strathpeffer.—The Nicholson Mackenzie Memorial Hospital has 15 beds at the disposal of patients requiring spa treatment. In 1908 eighty-eight patients were admitted.

Woodhall Spa.—The Alexandra Bromo-Iodine Hospital. There were 188 patients treated at this hospital during 1910, of whom 138 reported their condition two months later. Of these, 72 were greatly relieved, and 32 slightly better. Admission is by subscriber's recommendation, and a payment of ten shillings a week is required.

SEA BATHING CHARITIES.

Margate.—Royal Sea Bathing Hospital. Founded 1791. Number of beds 162, about 500 patients admitted per annum. Patients are divided into three classes: those who pay the

full cost and are admitted without a recommendation; those who pay a sum fixed by the governors and require also a recommendation; free patients, who are admitted on such letter only. Out-patients are also received and pay four shillings per month.

Scarborough. — Royal Northern Sea Bathing Infirmary. Founded in 1812. There were 691 patients admitted during 1910, including out-patients. Admission is by subscriber's ticket. In-patients are required to pay five shillings per week; no out-patients are now admitted.

HYDROTHERAPEUTIC HOSPITALS.

Southport. — The Hydropathic Hospital. Founded in 1861. In 1910 there were 715 patients admitted. Patients pay one pound per week, and also for certain baths at a shilling each. This cannot strictly be regarded as a charity, since in the year 1910 the amount paid by patients was £1,445, as against only £21 subscribed.

The foregoing account is as complete as I have been able to make it with the information obtained from annual reports, etc.; but further inquiries can be made from the secretaries of the different institutions. No attempt has been made to indicate the diseases most suitable for each institution, since this is dealt with in the descriptions of the different spas in another part of this volume.

Since many of these hospitals require payment from their patients, it should perhaps be mentioned that there are also other charitable institutions which provide board and lodging and medical advice at a reduced rate, but not baths or other treatment. I have not been able to make a complete list, but the following may be mentioned and fuller information can be obtained by writing to the matron or other official.

Bath. — Home for reduced gentlewomen.

Buxton. — Hartington House for reduced gentlewomen.

Woodhall Spa. — Home for gentlewomen.

CHARLES W. BUCKLEY, M.D.

THE EAST COAST OF ENGLAND, FROM BERWICK- ON-TWEED TO THE THAMES.

ON examining a map of the northern hemisphere, it will be observed that there is no land intervening between the North Pole and the east coast of Great Britain. Obviously, therefore, the air which has been cleansed by the intense cold of the polar region and drawn south by equatorial suction, must reach that coast in a condition of special purity. Consequently, the east coast holds, and rightly holds, an unrivalled reputation for what is called "bracing" air.

The northern portion of this coast is broken by the estuaries of large rivers such as the Tyne, the Tees and the Humber, which have been utilized, fortunately or unfortunately, according to one's point of view, for the creation of ports and the erection of factories not calculated to enhance the health-giving properties of the districts in which they are placed. On the other hand, the salubrity of this coast is increased by an amount of sunshine which is relatively great, and by the lowness of its rainfall—the lowest in the whole country.

From north to south, the reach of the coast now under consideration is about 350 miles; but the actual length of the coast line, if its sinuosities be followed, is much greater. With certain exceptions, to be noted later, its aspect is north-east. Its whole length of foreshore is of sand, varying in breadth; the greatest area being at Great Yarmouth, where, when the tide recedes, it extends from town to sea for more than a mile.

The sea shores of seven counties fall within this line of coast: Northumberland, Durham, Yorkshire, Lincolnshire, Norfolk, Suffolk, and Essex. Considering these in succession, with reference to their resorts, the coast of

NORTHUMBERLAND,

with the exception of Alnmouth, which lies in the estuary of a river, presents practically an unbroken line of rugged

and picturesque cliff. There are not many seaside health resorts in the county, but what there are present certain peculiarities. Piers and promenades are rare. The bathing is generally from tents on the sands. Hence these places are very suitable for children, and they are much frequented by families coming from the adjacent towns. Taking them from north to south, the most visited of these resorts are Bamburgh, Alnmouth, and Tynemouth.

Bamburgh is without a pier. The shore is excellent for bathing. The village is picturesque. Its associations are ecclesiastical, military and romantic. It was one of the earliest seats of Christianity in this country. The history of Bamburgh's wonderful castle is long and eventful. The village was the home of Grace Darling, and in times gone by the scene of the exploits of "wreckers."

Alnmouth is a particularly attractive place. It stands at the mouth of the river Aln, in which good fishing may be obtained. There is a promenade, but no pier. As all along this coast, owing to the firmness of the sands, the bathing is most pleasurable. Boating, golf and other recreations are available. The geology of this district is interesting, while the proximity of Alnwick and Warkworth Castles forms an attraction for those of antiquarian tastes.

Tynemouth is the largest of the seaside resorts on the Northumberland coast, though its situation at the mouth of the "smokey Tyne," and its proximity to docks and coal-mines, make it scarcely as acceptable as its smaller neighbours farther north. Its normal population—about 25,000—is largely increased during the summer.

DURHAM.

The coast of Durham in nearly all respects resembles that of Northumberland. Its bathing stations, fewer in number, are resorted to chiefly by the residents of the large neighbouring towns. The places most visited are South Shields, Roker, and Seaton Carew.

South Shields (population 97,000) is situated at the mouth of the Tyne. A great part of the town is given over to commercial purposes. The pier is a mile in length.

Roker is the seaside suburb of Sunderland, and, as such, is

much resorted to by the inhabitants of that busy town. The sea front is formed by lofty cliffs, with sand below. The student of history will find interest in the old church of the Venerable Bede, which is near at hand.

Seaton Carew is perhaps the most attractive of the Durham watering places. It is very small, having a population of not more than two or three thousand. It is situated in Hartlepool Bay, which is picturesque. The foreshore has a firm sandy promenade, which reaches six miles north and south. There are ample facilities for fishing and boating, while at the south end of the village is an excellent golf course. Lack of amusement in Seaton itself is compensated by that supplied in the town of Hartlepool, only two miles away.

YORKSHIRE.

Of all counties bordering upon the east coast, there is none which for extent (some eighty miles) and picturesqueness of coast line, for fine sandy foreshore, freedom from commercial towns, and wealth of local attractions for the health seeker, can rival the county of York. It is not surprising, therefore, that the health resorts on this coast are much in request, not only by residents of the many large towns within the county, but also by visitors from all parts of these islands as well as from places abroad.

The coast at the northern and southern extremities, where it merges in river valleys, is somewhat flat; but between these extremities it assumes the character of steep cliff, rising at some points to an altitude of 800 feet above sea-level. The foreshore below, save for an occasional patch of shingle, is everywhere of sand; broad, clean and firm, a paradise for bathers and an ideal place for the exploits of children.

The places most resorted to are (from north to south) Redcar, Saltburn, Whitby, Scarborough, Filey, Bridlington.

Redcar.—This is a town of some 8,000 inhabitants, situated at the north-east corner of the county. The sand here, as at other places on the coast, is excellent, and an enjoyable walk may be taken upon it to Saltburn, six miles to the south. There is a good pier, some 1,300 feet in length, and a sea promenade a mile and a half long. The place abounds in material of interest to the student of nature and to the antiquarian,

while to the sportsman the famous Redcar races are an attraction.

Saltburn is peculiar in having brine baths, which are supplied with salt water pumped up in Middlesbrough. It thus adds one of the advantages of a place like Droitwich to the benefits of sea air. The greater part of Saltburn is modern and well built. Standing upon the cliff at a height above the sea of 360 feet, there is little protection from the westerly winds which blow across the wolds.

Whitby.—This is a particularly picturesque place, of some 12,000 inhabitants, situated at the mouth of the Esk. The natives, mostly engaged in fishing, inhabit red-tiled cottages on each side of the river. Perched high on the south cliff is the famous St. Hilda's Abbey, of surpassing interest to the student of ecclesiastical history; while upon the north cliff are the principal hotels and lodging-houses for visitors. Below are the promenade, the west pier and the bathing places.

Scarborough, which disputes with Brighton the title of Queen of English Watering Places, is situated about midway along the Yorkshire Coast. It has a native population of some 40,000.

Within easy reach of the great commercial towns of Yorkshire and Lancashire, Scarborough, at certain seasons, suffers from an undesirable inroad of trippers. Their sojourn, being of only short duration, however, does not seriously interfere with the comfort of the more permanent visitors. The greater part of the town is built upon a rocky eminence overlooking two bays, the foreshores of which are known as the North and South Sands. Between them is the height upon which stands the castle—known as the Castle Hill. The south bay is the part most frequented by visitors. It has a sea promenade, known as the Foreshore Road, about half a mile in length, with a pier projecting from it midway. Here are to be found the usual attractions—or nuisances—of a popular seaside resort, the Pierrots and the Preachers; but the north bay, on the other hand, into which a pier also projects, is flanked by the Clarence Gardens, a quiet enclosure, suitable for invalids. Thus Scarborough caters for all kinds of visitors: for those in good health with abundant animation, as well as for those in poor health with depression. For the studious visitor coming here in search of health, there is abundant interest, whether he be

a naturalist or an antiquarian; while the lover of open-air recreation can obtain fishing, boating, golf and similar enjoyments, in the purest and most bracing of air.

Although Scarborough can be enjoyed all the year round, the most popular months are those of the summer, when the influx of visitors augments the local population by about one half. The mean temperature in summer is about 58°, in winter about 38°; while the annual rainfall is about 23 inches. The prevailing winds are from the west, but are not unduly felt, as the greater part of the town lies below the summit of the cliff.

Filey, while possessing a similar elevation, aspect and climate, is much smaller than Scarborough, having a native population of only some 3,000 persons. It is therefore much quieter and much less the resort of excursionists. Hence it is very suitable for the neurasthenic and those suffering from overwork, who need exhilarating air combined with repose rather than with excitement. The Lord of the Manor of Filey, to assert his ownership, occasionally exercises his right of drawing a net across the bay: a proceeding watched with interest by those curious in such matters.

Bridlington in some respects resembles Scarborough. It caters for the many, and is consequently much resorted to by "trippers." It is deficient in many of the natural attractions of either Scarborough or Whitby. But, being devoid of pretension, it is very suitable for those who desire to enjoy the bracing air of the Yorkshire coast at moderate cost.

LINCOLNSHIRE.

"The moist county of Lincoln," as Sir Walter Scott calls it, is best known for its fens, its ditches and its dykes. Except the hill upon which the City of Lincoln stands, there is little elevation other than sandhills. There being no hills to arrest the clouds, the rainfall is remarkably small, about 21 inches per annum. The shore is good sand and therefore affords good bathing. There are only four places which attract visitors, and as these have nearly everything in common, separate descriptions are hardly necessary. These are Cleethorpes, Mablethorpe, Skegness, and Sutton-on-Sea. Each of them invites the holiday maker rather than the invalid, though the

class of persons met there does not, of course, detract from the exhilarating nature of the climate. The railway companies seem to have determined that these places shall be specially reserved for people of limited means, and trains at remarkably low rates are run all the year round: a return day fare from London to Skegness, a distance of 131 miles in each direction, being, during the summer, as low as three shillings.

NORFOLK AND SUFFOLK.

These counties, forming, as it were, a parallelogram, may be conveniently grouped together. There is no point of the compass which is not faced by some part of the coast. Thus, while the greater part faces north or east, the coast from Hunstanton to Lynn looks west, and that of the peninsula upon which Felixstowe stands faces nearly south. Like Lincolnshire, these two counties are remarkably flat; but, unlike Lincolnshire, the first of them, Norfolk, is raised on a chalk plateau which terminates, except towards the south, in steep cliff at the seaside: cliff which is crumbling, and has long been tumbling into the sea, at the rate of about one foot each year. Suffolk is flat and, like Norfolk, has a sub-soil of chalk. The rainfall, as with other places devoid of hills, is small; the mean average for Yarmouth being about 22 inches, for Cromer rather less; for Lowestoft about 21 inches and for Felixstowe 20 inches.

Around the coast of these two counties are a number of places which, on account of their bracing air and the good bathing facilities they afford, present undeniable claims as health resorts. Those to which visitors chiefly go are Hunstanton, Sheringham, Cromer, Mundesley, Yarmouth with Gorleston, Lowestoft, Aldeburgh, and Felixstowe. All of these have the same broad stretches of fine, firm sand. As above stated, those within the county of Norfolk, from Hunstanton to Mundesley, are situated upon chalk cliff. South of Mundesley the shore line slopes, and at Yarmouth is quite level. Suffolk presents a coast line devoid of cliff, but the same sandy foreshore as Norfolk.

The popularity of the various places (depending, as it largely does, upon their capacity for offering entertainment) may perhaps be gauged by considering the normal populations of each. These are approximately as follows: Yarmouth, 59,000;

Lowestoft, 30,000; Felixstowe, 6,000; Cromer, 3,800; Hunstanton, Sheringham, and Aldeburgh, each, 2,500; Mundesley, 700.

Hunstanton and Cromer are described in detail, and by other pens, at the end of this section.

Sheringham, by its disinclination to receive a contingent of our Territorial Force, became recently the subject of newspaper comment. This incident has accentuated the fact that Sheringham is, and desires to remain, a reposeful and "select" resort. It is a very charming place, with surroundings of singular beauty.

Hotels.—Grand Hotel; The Sheringham Hotel.

Yarmouth and Lowestoft are much more "lively." In summer they are well suited for families who may like to combine entertainment with the advantages of a typically bracing east coast climate.

Hotel at Lowestoft.—Empire Hotel.

Mundesley and Aldeburgh are very quiet places, admirably adapted for the needs of invalid children.

Felixstowe, owing to its south-easterly aspect with some shelter from northerly and easterly winds, enjoys a sunny and genial climate. Nevertheless, its position on an elevated plateau ensures ample ventilation. As a winter residence it is one of the best of the east coast resorts. Intermediate in size between a village and a town, it is devoid of the dullness of the one and the bustle of the other. Insufficiency of trees, both for shade and for beauty, is, perhaps, its chief disadvantage.

Hotel.—The Felix.

The Norfolk Broads require notice in any account of the East Anglian health resorts. These Broads are not inland lakes, but lagoons of salt water, supplied by the adjacent ocean; and a sojourn upon them has all the advantage of a sea voyage without the misery of sea-sickness. For a calm, health-giving holiday of a few weeks they present many attractions for those of Bohemian taste. The stocking and cooking of the provisions, the business of navigating, the deck events at night, when the boat is at anchor after her day's work—all have an attraction for certain temperaments. One of two kinds of craft will usually be found suitable. There is the "skiff," with accommodation for one or two and a "skipper," who is

usually a boy ; and there is the “ Norfolk wherry ”—a covered-in barge something like a house-boat—for larger parties, and requiring the services of two men for its navigation.

ESSEX.

The coast of Essex is peculiar in this respect, that a great part of it is broken up into small islands. These islands are not suitable for habitation, but the channels between them form excellent fisheries and good harbours for yachts.

Essex, like Lincolnshire, is remarkably flat, the only elevated parts being in the neighbourhood of Harlow, Brentwood and Laindon ; the Laindon Hills reaching to the height of about 300 feet above sea-level.

On account of their nearness to London and an excellent service of trains, the sea-coast places of Essex are largely resorted to for the week-end, as well as during the summer, by dwellers and workers in the Metropolis, especially the eastern portion of it. Most unnecessarily, the railway company has added the words “ on-Sea ” to the official names of many of the places. Thus, there is “ Frinton-on-Sea,” “ Clacton-on-Sea,” and “ Southend-on-Sea,” although, with regard to the last, the term “ Southend-on-Mud ” might be more applicable. All these places, however, with others, such as Walton-on-the-Naze, Burnham-on-Crouch, and Dovercourt, have the same health-giving properties as places farther north.

Clacton faces nearly due south. It is well sheltered from north winds, and to some extent from the east. Fogs are uncommon. It is favoured by a “ supper train ” from London on Saturday night, which reaches Clacton at 1 am.

Frinton and Walton are much less sheltered.

Southend, within an hour’s run of London, at a return fare of 2s. 6d., is served by some eighty trains a day. It may be regarded as a suburb of the “ East-end.” No one with an interest in Cockney customs should fail to witness the Bank-holiday maker “ tripping it on the quay ” at Southend.

S. D. CLIPPINGDALE, M.D.

HUNSTANTON.

Hunstanton, or as locally pronounced, Hunston, is situated on the eastern, or Norfolk, shore of The Wash ; but has a



Photo by E. Rolph, Hunstanton.

THE CLIFF, HUNSTANTON.

[To face p. 142.

western aspect, overlooking The Wash, with the Lincolnshire coast in the distance. To the fine sea view from the promontory on which it stands is added, in spring and autumn, the glory of the sunsets; while it is even possible to see the sun both rise from and set in the sea.

Owing to its westerly aspect, as well as to the shelter of undulating and wooded country behind it to the east, the force of the east wind is to a certain extent tempered, even on the higher ground; while on the sands there is the additional protection of cliffs rising in places to a height of sixty feet or more. These cliffs are remarkable in their gradations of colour from white chalk at the top, through grey and deep red, to dark brown carrstone at their base. The effect of these bands of varying hues, here blending and there distinct, is both peculiar and picturesque, and especially striking when seen under the rays of the setting sun.

The sands are firm and wide, and excellent for bathing. The flat rocks, exposed at low tide, tempt active spirits to leap from one to another, and there has thus been evolved the capital local sport of pole-jumping, at which dozens of children may be seen enjoying themselves during the season.

The climate is dry and invigorating, without being too severe, and may well be recommended to patients suffering from diseases of the respiratory tract, especially in the autumn months. The rainfall is low. In 1910, in spite of the inclement weather, it only attained to 18·26 inches. Surface water dries up quickly, owing to the chalky subsoil on which the town is built. It is to be noted in this connection that the conditions are very favourable for those suffering from rheumatism in any of its numerous forms.

Above all, Hunstanton is to be recommended for convalescence after acute illness or operations. Abundant testimony as to its recuperative effects is to be found in the records both of the Hunstanton Convalescent Home and the Addenbrooke's Home of Recovery. Patients of this class sent here soon regain their lost appetites, and it is frequently to be noticed that those elsewhere subject to insomnia can sleep well after a short stay.

Children with glandular enlargements improve very rapidly in the dry climate and abundant sunshine.

Ample accommodation is provided for visitors by good

hotels and lodging-houses. There is an excellent golf course, with facilities for tennis and other outdoor recreations.

Sandringham is only eight miles distant, Castle Rising eleven, and the interesting old seaport of King's Lynn sixteen miles by rail; while the surrounding country offers the visitor many charming excursions.

CHARLES R. H. BALL, M.R.C.S., L.R.C.P.

Hotel.—Great Eastern Railway Co's. Sandringham Hotel.

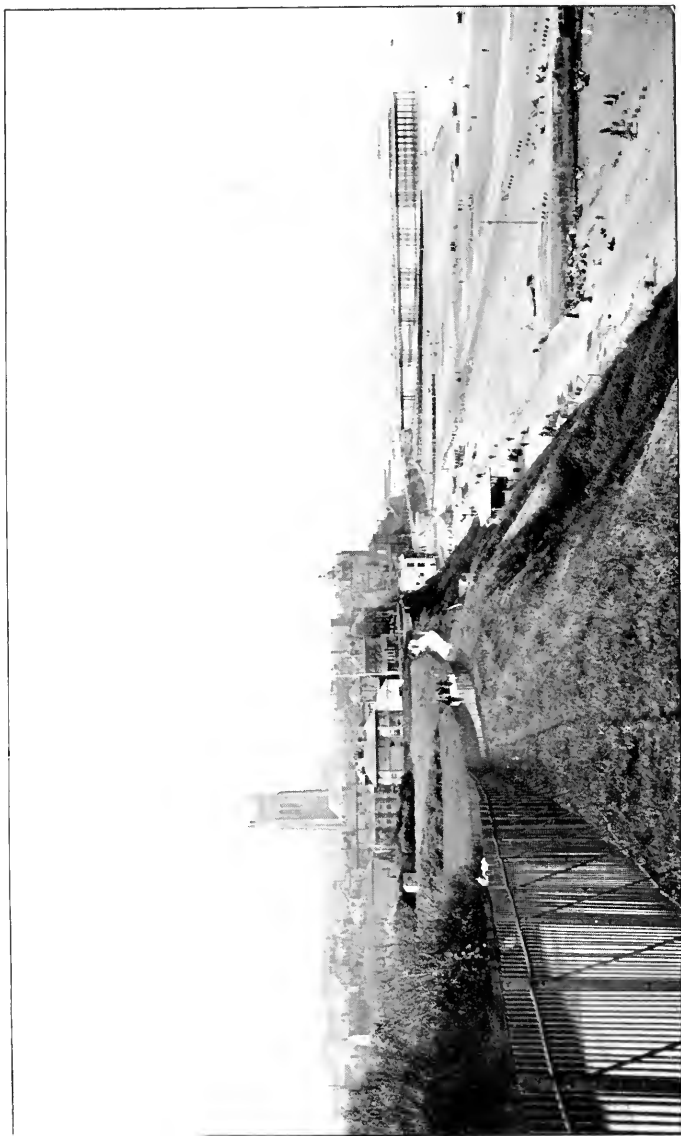
CROMER.

Among the health resorts of our East Coast, Cromer—long celebrated for its pure air and invigorating breezes—in some respects stands alone. For, in addition to the characteristic bracing air, the place possesses beauty equal to that of many parts of Devonshire, and, with its surrounding wooded heights and heather-clad hills, is a revelation to the visitor who sees it for the first time.

Cromer is attractive at all seasons; in spring, with its wealth of bright green foliage, daffodils, and wild flowers, and its miles of rhododendrons in full bloom. In summer, when many other towns are hot and stifling, it is cooled by the breezes from the North Sea; while, were the genial climatic conditions of the autumn and winter more generally known, Cromer would become a holiday resort even up to the end of the year.

The appended table—based on the records for the past nine years, and averaged—speaks for itself.

| Month. | Barometer. | Rainfall. | | | Shade temperature. | | Sunshine. |
|-----------------|------------|---------------------|-----------------|--------------------|--------------------|----------|-----------|
| | | Maximum day's rain. | Total rainfall. | No. of rainy days. | Maximum. | Minimum. | |
| | Inches. | Inches. | Inches. | | | | Hours. |
| January . . . | 30·023 | ·39 | 1·52 | 20 | 43·1 | 34·2 | 67·9 |
| February . . . | 29·907 | ·29 | 1·31 | 19 | 44·6 | 34·6 | 74·4 |
| March . . . | 29·880 | ·33 | 1·41 | 21 | 47·8 | 35·8 | 184·5 |
| April . . . | 29·908 | ·27 | 1·33 | 17 | 51·8 | 39 | 169·4 |
| May . . . | 29·955 | ·56 | 1·71 | 14 | 58·6 | 44·7 | 203 |
| June . . . | 30·031 | ·47 | 1·88 | 16 | 62·1 | 49·5 | 183·3 |
| July . . . | 29·978 | ·62 | 2·04 | 15 | 67·4 | 53·4 | 209·7 |
| August . . . | 29·947 | ·59 | 1·86 | 17 | 68·3 | 53·4 | 194·1 |
| September . . . | 30·056 | ·49 | 1·62 | 17 | 63·7 | 51 | 167 |
| October . . . | 29·892 | ·47 | 2·47 | 22 | 57·3 | 46·2 | 102·3 |
| November . . . | 29·863 | ·52 | 2·19 | 23 | 48·7 | 39 | 64·7 |
| December . . . | 29·803 | ·47 | 2·25 | 23 | 44·8 | 35·5 | 41·5 |



CROMER.

That Cromer attracts so many well-known English people, who return to the neighbourhood year after year, is, therefore, not surprising. It has had its royal visitors, as well as members of both Houses of Parliament. In 1887, the Empress of Austria was ordered here, and derived much benefit from her visit.

The public bodies of Cromer, while doing all in their power to promote the health and comfort of the visitor, make no needless restrictions. Except when an entertainment is taking place, the pier may be used for roller skating, and at stated times cycling may be indulged in on the parades. There is splendid bathing, which is made even more enjoyable by the fact that officially appointed boatmen patrol the water during the chief bathing hours, thus ensuring the safety of all swimmers; while the sands are always delightful, and free from the nuisance of itinerant vendors.

Should the visitor wish to indulge in boating, or fishing, these are easily within his reach. Small boats may be hired, and excellent sea fishing is available from boat or pier.

The list of recreations and amusements is a sufficiently long one, and includes golf, tennis, bowls and croquet. Those less actively inclined can also find much pleasure; good music is provided, and popular pieces from London theatres presented. A quiet game of billiards, or rubber of bridge, is obtainable at one or other of the clubs in Cromer, both of which gladly open their doors to the temporary member who brings with him the necessary credentials.

Indoor life at Cromer is comfortable, and one might go far to find better hotels, boarding-houses or apartments. These are by no means all high priced; indeed, one is often surprised that such excellent accommodation is offered at so low a rate.

The train journey is not irksome. The traveller from London may accomplish the intervening 129 miles in less than 3 hours. Liverpool is but 220 miles away.

Cromer is well served by two railways, by which places of interest in the neighbourhood may easily be reached. There are frequent excursions to the Norfolk Broads, Sandringham, Weybourne, and Norwich. Circular trips comprising rail and boat, or rail and coaching, form an attractive feature among the facilities offered by these lines.

Cromer is remarkably healthy, but, should the visitor by

any chance feel ill, he may take comfort in the knowledge that the best advice and attention are at hand. In addition to other resources the place boasts an excellent Nursing Home. As to which among the sick or convalescent will derive most benefit from the air—any class of patient able to bear the journey from home can be sent with safety. For those who need bracing air after an acute illness, for the consumptive who is yet in the early stages, and the sufferer from similar diseases, the situation of Cromer, and the neighbouring pine-woods, combine to render it a natural sanatorium. Young children, too, with a tendency to enlarged glands derive much benefit; while those who are under-developed could certainly be taken to no better place.

J. E. M. J.

Hotels.—Grand Hotel; Overstrand Hotel (near Cromer, 2 miles).

ISLE OF THANET.

ALTHOUGH technically an island, the Isle of Thanet is practically a promontory of the county of Kent. Its subsoil is of chalk, covered—in most places but thinly—by a light loam. The island nowhere rises more than some hundred and eighty feet above the sea; and it possesses no mineral spa; although springs of chalk-saturated water find their way to the sea in many directions and furnish excellent drinking water.

Balneology, in the Isle of Thanet, therefore, is restricted to the branch known as thalassotherapy. Climatology, on the other hand, has here a wide scope. The elevations above the sea of the coast towns vary from nothing to about one hundred feet; the highest point in the district being near the middle of the island; but, little as their elevations vary, their aspects vary much: that is, from north through east to south-east.

The villages and hamlets not lying by the sea have no very marked characteristics.

The seaboard faces north along the greater part of its extent; thus, although the island is the most easterly part of the United Kingdom, three of its five coast towns look more or less directly north. Stress is laid upon this fact, since it is commonly not apprehended by many who, lacking a personal knowledge of the district, erroneously regard it as having for the most part an easterly exposure; whereas, in fact, there is no land intervening between its coast and the region of the North Pole.

The rounded contour of this tip of the kingdom gives, it is true, to a part of its coast line, not only an easterly, but a south-easterly aspect, even. Hence different conditions are found within the space of a very few miles.

The climate of Thanet has as its essential characteristics dryness of soil, due to the unlimited absorbency of the underlying chalk; a freedom from mist and fog, attributable to the same cause, as well as to the almost constant movements of

the air; abundance of sunshine, and, above and beyond all, air of a peculiarly invigorating quality which has hitherto defied analysis. The result of this combination is a climate peculiarly suitable for the young, and especially beneficial in cases of any tuberculous affection of the bones, joints or lymphatic glands.

Such being the characteristics common to the whole island, it will here be necessary to note only a few special features of its more important watering places, taking them from north to south.

Westgate-on-Sea is separated by considerable stretches of open ground, on the west from Birchington and on the east from Margate, the climate of which latter it shares. The town, which is compact, skirts two bays, and the aspects of the houses facing the sea vary in consequence. All these houses are detached and have gardens. On the cliff, and behind the sea walls, upon which runs a broad esplanade, there are sheltered gardens, and a large stretch of open turf.

All the roads near the sea are privately owned, and a control is therefore possible which precludes many of the objectionable features of places patronized by the casual tripper, for whom no attraction is here provided.

The sands are entirely covered by every tide; but soon after high water many acres are exposed, greatly to the enjoyment of children, for whom this place presents many advantages.

The town is much crowded in August, as, indeed, are all those on this coast.

Margate possesses some 27,000 inhabitants. It borders a considerable length of sea front, and is intersected by a deep valley, in which there is a public park. The town has a fine pier, a large covered Pavilion, and good hotels.

Not to every one, even in Great Britain, is "The Isle of Thanet" a familiar name; but throughout the English-speaking world it would probably be difficult to find a place in which that of Margate is unknown. The resort has a literature and tradition of its own, from the old days of the "Margate Hoy" to ours of "Palace" steamers and express trains; calling up associations, under one aspect, of happy trippers and crowded sands; under another, of "bracing" breezes and "strong"

air. To the latter expression strict climatology demurs; but, letting it pass in the sense that the air makes the breather of it strong, it would be churlish to begrudge the day excursionist his brief draught of so beneficial a stimulant. Nor, indeed, is it wholly just to stigmatize the town as the Mecca of Tripperdom exclusively. There is no denying that at certain places and seasons this element is much in evidence; but the transient pilgrims of pleasure throng only one section of the sea front, leaving the rest of it to the quieter and more permanent visitor.

With a reputation so firmly established among all classes for invigorating air, and, in medical circles, for benefit to cases of surgical tuberculosis, Margate need pay little heed to the wagging of derisive tongues.

The town is neither imposing nor well planned. In size and in architecture, both public and private, it falls short of what might be expected of a health resort with its wide fame for the treatment of a very large group of maladies.

Margate, in its therapeutic aspect, at all events, is not well known to foreigners. Should its renown for producing wonderful results within a short time spread to the United States, however, an indubitable consequence would be a rapid influx of Americans—eager seekers as they are for the short cuts, whether to wealth or to health.

Hotel.—The Cliftonville Hotel.

Broadstairs skirts a bay between Margate and Ramsgate, and has an easterly exposure. The cliffs on either side shelter the town from the full force of the north-easterly and south-westerly gales of February, March and April. The daily range of temperature is remarkably small. The air is clear and crisp, and the sunshine abundant: from the end of October to March, notably so for that time of year. The soil dries quickly after even the heaviest rains. The warmth and dryness of the air, and the shelter afforded by the cliffs, enable even invalids to spend most of the day out of doors without danger, although the weather may not be fine. The water, originally hard from its passage through a chalky soil, is submitted to a softening process at the waterworks before being supplied to the town.

Broadstairs is still the quaint, old-world town it was when

immortalized by Charles Dickens, whose former residences there are marked by commemorative tablets. "Bleak House" remains, overlooking the sands and the same old-fashioned jetty as when he lived in it; but since his day gardens have been laid out on the cliff, along which, too, a promenade has been constructed; both adding to the charm of the pretty little seaside place he loved.

For bathing, which may here be enjoyed until well on into the autumn, there is, at low tide, a fine long stretch of slightly shelving sands, a noteworthy feature of which is their cosily sheltered position. So sheltered are they, indeed, that when a cold east wind is blowing, the temperature on them is several degrees higher than that on the cliffs.

Broadstairs is an excellent resort both for extreme youth and extreme old age, and has a winter climate admirably suited for the majority of invalids. *Par excellence*, it is a place for children. It has been observed that young people brought up at Broadstairs bid fair to acquire a stamina such as will serve them well later in life, and last them even into old age.

It is generally believed that the air of the whole sea coast of Thanet is specific in its influence in cases of surgical tuberculosis. Hence, in choosing between one resort and another, it is not the morbid process, but the patient's power of resistance which must be considered. It follows that, just as Broadstairs is specially indicated for both the extremes of age, so it may wisely be selected for such adults as might find the air of Margate too harsh, or that of Ramsgate too sedative.

Cases of tubercular lung disease do remarkably well at Broadstairs, in the quite early stages; later on, they do equally badly: an absolute contra-indication is the stage of cavitation.

While most asthmatics are benefited, those peculiar cases which thrive best in smoky cities should not be sent to Broadstairs.

The following cases, also, have been clinically observed to do remarkably well: bronchitis; nervous affections, whether functional or organic; heart disease in the earlier stages of compensatory failure; and rheumatoid arthritis, although this last-named malady is usually supposed not to thrive by the sea. As in the neighbouring resorts, convalescents from acute disease regain health with great rapidity.



By permission of the Broadstairs Entertainment Committee.

BROADSTAIRS.

[To face p. 150.]

The subjects of high arterial tension, whether from renal disease or other cause, do not do well at Broadstairs. Diabetes does so badly that cases should not be sent—the bracing air apparently tending to bring on coma.

Hotels.—The Grand; The Carlton.

Ramsgate, the largest town on the Island, faces south-east, and is separated from Broadstairs by a tract of open land. It possesses the only harbour in the Island, so that only here is there shelter for yachts. To the south of the town, the famous Pegwell Bay receives the waters of the Stour, by which the Isle of Thanet is bounded. Here are the historic spots at which Julius Cæsar and Saint Augustine landed on British soil. The town rises abruptly on either side of its harbour, and has excellent sands and a sunny and invigorating climate.

Hotel.—The Granville.

By various Contributors.

THE COAST OF KENT, FROM SANDWICH TO FOLKESTONE.

ALONG this portion of the coast there are, besides Sandwich and St. Margaret's Bay, the towns of Deal and Walmer, Dover and Folkestone. Sandwich, Deal, and Walmer face due east, and have no protection from the north or east wind. However, this tends to make them cool in summer. St. Margaret's Bay, Dover, and Folkestone, have a good deal of protection from both of these winds.

Geology.—From Sandwich to Kingsdown, a couple of miles south of Deal, the coast is flat, but from Deal to Folkestone the cliffs gradually rise, until—from St. Margaret's Bay to Folkestone—they form a considerable protection to the coast. At Folkestone the shore is formed of the Lower Greensand, the chalk downs retiring inland to about a mile behind the centre of the town to the north and north-east. They are here about 500 feet above the sea-level. Between the foot of the hills and the edge of the cliffs is a plateau, on which Folkestone is situated. This is composed of chalk and Greensand, resting on beds of clay which slope towards the sea. The coast from Sandwich to Deal is composed of a belt of blown sand, broad at Sandwich and narrow as it approaches Deal, where it is known as the "Deal Sand Hills."

Climatology.—Though so much exposed to the winds, the climate is not so harsh as that of Thanet and the coast farther to the north. There are two circumstances which contribute to this modification: first, the more southerly latitude; secondly, and of still greater importance, the neighbourhood of a southern sea, under the distant influence of the Gulf Stream, and a highway for the tempered Atlantic breezes. For these reasons, the climate of the stretch of land facing the Downs is strictly not comparable to any other on the east coast. It is not, indeed, so much bracing in itself, as from the

effect of strong breezes off the sea, especially of those from the east and north-east.

Dover and Folkestone, being farther from the North Sea, and in a more southerly latitude, are a good deal warmer than the three more northern towns, and have, as well, the protection of the Downs to the north and north-east.

Sunshine.—All the coast stations in the region under consideration enjoy more sunshine than prevails inland, and the least favoured among them is better off as regards hours of bright sunshine and intensity of solar radiation, than many places of lower latitude on the Continent.

Rainfall.—The rainfall is much less here than it is more to the west. This is accounted for by the absence of hills in the northern part of the district. Where the Downs recede inland from the town, rain can often be seen falling at the same time that the plateau on which the town itself stands is bathed in brilliant sunshine.

Fog.—Land fogs are practically unknown on this soil, dry and well drained as it is by nature; and even sea fogs are comparatively rare. They are, however, of more frequent occurrence than they are farther west, owing to the meeting of the cold North Sea water with that of the warmer English Channel.

Wind.—It is obvious that the same winds blow over the whole coast, but their volume and strength is largely governed by local influences. Folkestone, Dover, and St. Margaret's Bay, especially the last, are to a great extent protected from the north and north-east; but Sandwich, Deal, and Walmer are considerably exposed to both. The case is reversed as to the south-westerly and westerly winds, which prevail for about nine months of the year. It is, however, in the spring, when the east wind is the more prevalent, that wind protection is more important.

Sandwich, while a veritable mine of interest to the archæologist, is scarcely of sufficient value as a health resort to require description in this volume.

Deal and Walmer.—Walmer is an extension of Deal along the road to Dover. The northern half is on sand and shingle, the southern half is on chalk. At the back for five or six miles is a flat green plain. While the spring is usually wet,

the autumn is often fine. There is no protection from the east or north. The district must be regarded as very exposed, but lacks the dry, bracing quality to be found in the chalky uplands. As a winter resort it is far too cold, but it is much visited in summer by families who are content with simple attractions.

St. Margaret's Bay is about four miles north-east from Dover, and is completely sheltered from the north and north-east by the promontory of the South Forelands, the highest point of which exceeds 400 feet. The Bay is reached from Martin Mill railway station, distant about two miles. It is about a mile broad, and has the protected character of the Undercliff of Ventnor, though the climate is more bracing. Frost and snow are almost unknown in the winter, and vegetation thrives surprisingly.

Accommodation.—The accommodation is rather limited. In the summer there are a number of private residences to be let.

Hotel.—The Granville.

Climate.—The soil is principally chalk, which dries at once after rain, so that there is no mud, even in winter. The rainfall is much less than at Dover and the neighbouring towns. The temperature varies according to the level, being much warmer down at the sea than higher up, and lowest at the top. There is nearly always a breeze, and every wind that blows over the place, with the exception of the north and north-west, is a direct sea-breeze. The best time for invalids is from May to November. The sea, once having been heated up to the summer temperature, cools very gradually in this part of the Channel. Thus, in October and November, visitors may count almost with certainty on being able to dispense with fires, and even read at an open window—enjoying an amount of sunshine and a freedom from damp and fog which they would find at no other watering-place on this coast. In early summer and spring there is a good deal of fog.

Cases suitable.—All convalescents and children do well here. Consumptives and chest cases benefit greatly from the pure air. Persons suffering from overwork and mental strain derive great benefit from this quiet little place. Its hilly conformation renders it unsuitable for those suffering from

cardiac disease, from asthma, or from anything which makes hill climbing undesirable.

Dover.—This one-time fashionable health resort is in process of taking on greatness of another kind, but what it is gaining as a naval and mercantile harbour is somewhat to its detriment in the former respect.

Climate.—Dover faces south. It is flanked and screened in the rear by the heights of the chalk range. Consequently it is protected from the north, north-easterly, and north-westerly winds. It is apt, however, to be uncomfortably hot in the summer. The climate is dry—less mild than St. Leonards, less keen than Brighton. There is a good deal of wind in the late winter months and early spring. The prevailing wind is south-west, and this blows for 104 days in the year. Dover is much exposed to sea fogs.

FOLKESTONE.

By far the most important, and nearly the largest town in the district under consideration is Folkestone. It has a residential population of about 33,000. The town lies near the extremity of a range of chalk cliffs, which extend all the way to Dover, seven miles distant. Situated on high ground, overlooking the Straits of Dover, and sheltered to the north by the Downs, 500 feet high, Folkestone has natural advantages which entitle it to high rank as a health resort. The town is built on a plateau facing south, and at its higher point, 177 feet above the sea-level. From its highest elevation at the western end it gradually descends on the east, to a valley which intersects it. To the east side of this valley the plateau rises again, continuously and gently, until it merges in the chalk hills to the north-east. The plateau ends abruptly on the sea front in cliffs, along which extends that fine promenade, "The Leas," which is the chief feature of Folkestone. This offers the advantage of bracing sea-breezes, while in the early part of the year its cliffs afford protection from the cold winds to invalids and visitors seeking open-air exercise in the grounds tastefully laid out below, between the cliffs and the sea. The Folkestone plateau projects slightly from the coast line, and so has considerable ventilation

from the sea; a point of great advantage in the hot weather. Folkestone, in fact, is seldom too warm, even in the hottest summers.

The town is well planned. There is no crowding of houses, most of which, in the west end, are grouped around gardens, with lawns for tennis and croquet. Trees planted along the roads and avenues add a charm to the town.

There are hydraulic lifts from the undercliff to the Leas. Below the Leas, at the edge of the sea, a promenade has recently been constructed. The whole undercliff, as well as much of the face of the cliff, has been beautifully laid out in walks and winding paths, with numerous seats.

The view from the Leas is well described in a local guide book: "From the Leas on a clear day may be seen the coast of France, and often with the unaided eye the Cathedral of Boulogne, thirty miles away, is discernible. There are few nights when the revolving lights of Cape Grisnez near Boulogne are not visible, and frequently also those of Calais and Boulogne may be seen. Away to the west the newly erected lighthouse at Dungeness throws its beams, and half way across the Channel there is the tiny red light shed by the lightship on the Varne sands, over which the water is so shallow as to be dangerous for large vessels."

The country around Folkestone is varied and picturesque, with many charming walks and drives, and the near neighbourhood of Shorncliffe Camp is an advantage to the town.

Ample provision is made for athletic amusements such as riding, tennis, rowing and roller skating; and there are facilities for excursions by steamer along the coast, or to Boulogne. There is a good cricket club and grounds, and first-rate golf links close to the town. The golf links at Hythe and Littlestone are easily visited by means of public motors, which provide a frequent service.

Accommodation.—Accommodation will be found to suit all purses, from the humblest apartments to some of the most luxurious hotels in the kingdom. In most of the hotels it is possible, by arrangement, to have a simple dietary instead of the elaborate menus suited for the robust and hungry. There are a large number of well-furnished houses to be let.

Geology.—The Folkestone plateau is composed of beds of



[To face p. 156.]

FOLKESTONE

(To show the different levels.)

chalk and Lower Greensand, which rests on a basis of clay, the latter in a few places cropping out on the surface. Thus a natural drainage is formed, causing the ground to dry up very quickly after rain.

Climate.—Much evenness of temperature is claimed for Folkestone, the manner in which it projects into the sea lending it a coolness in summer and a warmth in winter not enjoyed by inland places. The mean annual temperature is 49.8° . The mean daily range is 10.7° . The mean relative humidity is 81 per cent. The rainfall is 26.6 inches, and the sunshine 1850.6 hours. The prevailing wind during the summer and autumn months is from the south-west; the north-east wind being most felt during the first four months of the year.

Sea Bathing.—The sea at Folkestone is clear, and usually inviting in appearance, the shore being beach or shingle. Bathing forms one of the chief attractions of the place; more than ever now that mixed bathing is allowed. This is here well regulated, under the supervision of the Bathing Establishment Company, who have provided neat canvas cabins on the beach. These are more readily aired and kept clean than the old wooden machines. At low tide the rocks form an inner basin, in which any one can bathe with perfect security. A boatman is in attendance to render any assistance necessary. For those who are nervous, or unable to swim, there is provided a unique arrangement known as the "Crates"—enclosures within iron railings, with bottoms of coarse matting, attached to a huge bathing-machine with numerous cubicles. In these Crates there is no danger of drowning. One is provided for each sex.

Bathing Establishment.—The bathing establishment at the foot of the Leas contains handsome swimming, as well as ordinary and medicinal baths. The Turkish Baths are in the west end of the town, and besides the ordinary hot-air bath, are furnished with every variety of medicated bath usually required by invalids. Among the baths and treatments obtainable there may be specially mentioned the high frequency, electric, Greville, mercurial, Droitwich, vapour, sitz, sulphur, Nauheim, etc.

Medical Aspects.—Folkestone being a tonic and bracing place, it follows that it is a resort chiefly fitted for those whose

vitality requires stimulation. It is the place *par excellence* for convalescents, or those suffering from chronic disease, especially for those whose constitution has been depressed by accident, illness or anxieties. These cases will here find a cure, or steady improvement at the least. The town provides amusement and change in abundance for those who, though not ill, require a holiday. And although every attention is paid to the requirements of invalids, it is not a place where crowds of thin and pale people force their suffering into prominence.

Res. in To mention a few of the many diseases which are benefited: insomnia is usually greatly relieved. The air tends to induce sleep in the healthy, and sufferers from sleeplessness frequently rest well throughout their stay. Tubercular cases do extremely well, especially cases of phthisis without much bronchial catarrh. There are many houses facing south, on the front and elsewhere, in which a fresh-air cure can be carried out with ease all through the winter; a number of them are fitted with verandas. One of the large hotels has specially designed "loggias," which are veritable sun-traps, with arrangements for keeping them ventilated with fresh air while warding off the wind, if excessive.

Other diseases benefited are anæmia, tropical cachexia and ague, chronic kidney disease, dyspepsia, chronic diarrhœa and dysentery, and Graves's disease.

In winter, cases of bronchial and laryngeal catarrh should not be sent, on account of the strong winds; but in the summer and autumn they do well. The town has a great reputation in nervous disorders. Rheumatism, rheumatic fever, and rheumatoid arthritis are extremely rare in residents.

That the place is a remarkably good one for children is amply evidenced by the large number of boarding-schools for both girls and boys, as well as by the healthy appearance of the inmates.

P. L.

Hotels.—Grand Hotel; Avenue Mansion (private hotel).

THE SOUTH-EAST AND SOUTH COAST OF ENGLAND, FROM SANDGATE TO SOUTHSEA.

THIS portion of the south coast lies successively in the counties of Kent, Sussex, and Hampshire, and covers, roughly, a distance of about 160 miles. It has three prominent headlands—Dungeness, Beachy Head and Selsey Bill; while at various points a number of small rivers such as the Brede, the Rother, the Ouse, and the Arun flow into the English Channel. Along this coast, a bird's-eye view would show, first, a sandy shore, from Sandgate to Hythe; followed by the extensive alluvial plain of Romney Marsh, a noted sheep-grazing locality; then Rye, one of the old Cinque Ports. At the eastern end of Hastings terminate the cliffs which run from the inland height of Winchelsea. From there to Pevensey extends another broad tract of flat land, with a somewhat clayey and sandy soil. At the high, chalky cliff line of Beachy Head (559 feet) the South Downs turn inland in a north-westerly direction. This chalky formation continues as far east as Bognor and Brighton. From Brighton westward the coast is low-lying, with a clayey soil, and somewhat uninteresting. Here and there, indeed, are striking evidences of the varied effect that the sea has had on the Sussex shore, where estuaries and harbours have been silted up, thousands of acres of land submerged, and even the course of some rivers considerably modified. The climate of the Sussex coast is milder than that of Kent, Sussex being more sheltered on the north and east, as well as under the influence of a comparatively warm sea. The coast also enjoys a warmer winter and a cooler summer than the country north of the South Downs. The average annual rainfall along this part of the south coast is about 26 inches; the most prevalent winds are from the south-west and west, and the chief meteorological features may be thus summarized: a lower rainfall, a greater

relative humidity, a more equable temperature, and a less marked daily variation of temperature as compared with the more northern inland districts.

Taking Folkestone as a starting-point and proceeding westward along the Kentish coast, at one and a half miles' distance we find Sandgate, a pleasant summer resort with a moderate rainfall and sandy soil, fairly well protected from the north and north-west winds.

The next seaside resorts, proceeding from east to west, are the important towns of Hastings with St. Leonards, Bexhill, and Eastbourne, separate accounts of which follow the present article. Midway between Eastbourne and Brighton is Seaford, on a chalky subsoil, with a fairly equable and dry climate, a good proportion of bright sunshine, and a generally bracing air, suitable for convalescents. Behind the town, the South Downs reach one of their highest points at Firle Beacon (820 feet). Seaford has good links, and a shingly beach for sea bathing.

Next comes the popular resort of Brighton, which admirably combines the advantages of the seaside with those of a large residential town. It is only fifty-one miles from London, with which it is connected by an excellent service of express trains. More or less under royal patronage since the days of George IV, Brighton has steadily grown to a present residential population of over 130,000. It has become the home of many busy city men, the rendezvous of pleasure seekers, and a seaside *pied-à-terre* for the fashionable and wealthy. Under another aspect, it is an important educational centre, with numerous schools and colleges. The town, built mostly on a chalky soil, faces south and south-west, and is sheltered by the Downs from the north and east. The air is keen and bracing, the sky usually clear and bright. Brighton has a good share of sunshine, a comparatively low rainfall, and a moderate relative humidity. The prevailing winds are from the south-west and west; the driest month is May, and the most humid January. One end of the beach is very suitable for sea bathing, and there is a fine parade, four miles long. The place is a good one for most convalescents, for delicate children of the strumous or tubercular type, and for such conditions of general ill-health as are marked by anæmia, debility and

want of "tone." The best season for health and for climatic treatment is the autumn.

Hotel.—The Norfolk.

Situated about ten miles west of Brighton is **Worthing**, a fairly sheltered resort facing almost due south, effectually protected from the north and north-east winds by a semicircle of the South Downs, and from the south-east by the bold headland of Beachy Head. Worthing has a mild, fairly dry, and comparatively equable climate. The most prevalent winds are from the south-west, west, and south. The annual temperature averages 50° F. The sunshine record is usually over 1,700 hours in the year. A low rainfall, an absence of land fogs, an average relative humidity of 83 per cent., *plus* many constant marine influences, all combine to make its climate a suitable one for invalids, while in it thrive fig trees, myrtles, magnolias, fuchsias, heliotropes, and roses, as well as some exotic plants. There are fine sands and good sea bathing. A winter residence at Worthing is beneficial in chronic bronchial catarrh, in some forms of spasmodic asthma, in chronic renal disease, in chronic rheumatism, and for children, especially those suffering with whooping-cough; as well as for old people and Anglo-Indian invalids whose health has been injured in a hot climate.

Bognor is a quiet seaside place seventeen miles west of Worthing, facing south, on a chalky soil, with an extensive sandy beach suitable for children. The climate is mild and fairly equable; there is a distinctly low rainfall, a good record of sunshine, and a comparative freedom from fog or frost. It is suitable for chronic disease of the respiratory organs, for the aged and infirm, and for delicate children.

The last south coast resort of importance is **Southsea**, practically a modern extension of Portsmouth, built on the island of Portsea. It is exposed to the south, but protected by the Portsdown range on the north, and, to a limited extent, by Portsmouth and the Isle of Wight to the south-west. The climate is mild, with a rather high relative humidity in winter. Southsea is a favourite resort with the families of retired naval and military officers, and, besides the varied incidents in the life of a garrison town, affords plenty of facilities for boating,

yachting, and sea bathing. It is a good place, also, for convalescents; and many delicate persons, as well as some sufferers from chronic lung disease, find it a suitable winter residence. Southsea has a large, grassy common, but the town is lacking in trees and shrubs. As a space for physical exercise, the common is ample and admirable, being open and breezy, and within the full influence of the sea.

NORMAN HAY FORBES, F.R.C.S. (Edin.).

Hotels.—The Queen's Hotel; The Royal Pier Hotel.

HASTINGS AND ST. LEONARDS.

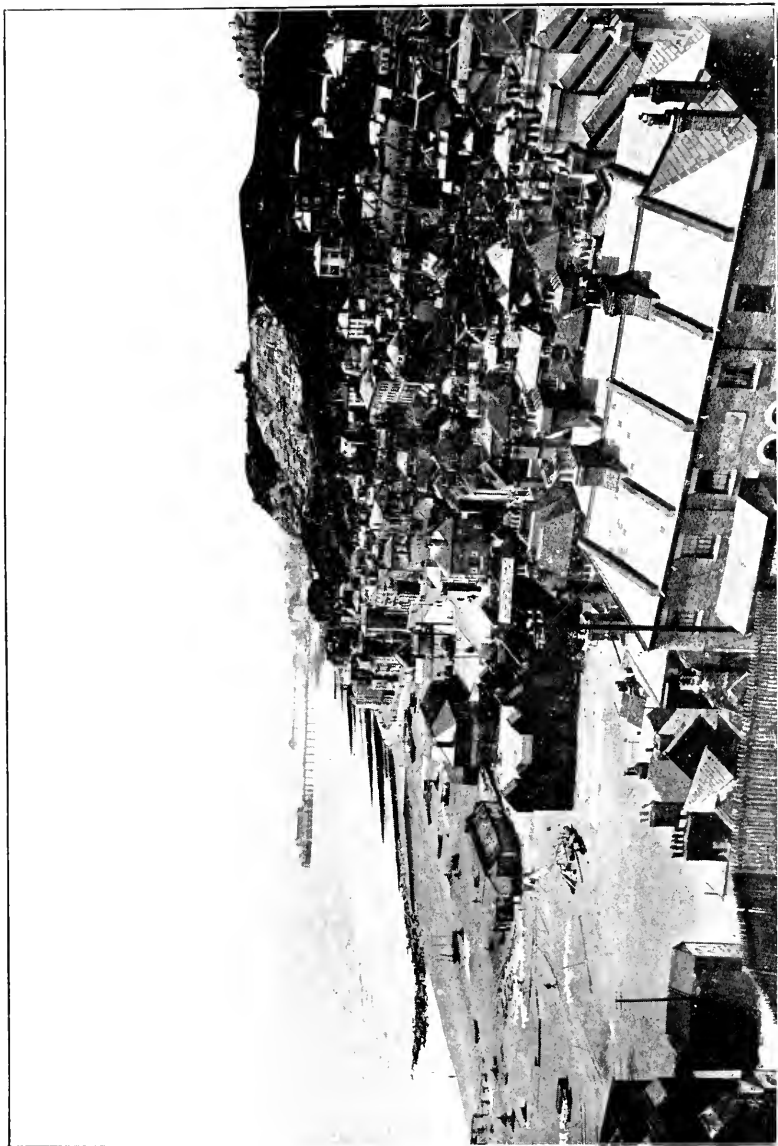
Hastings, with its more modern sister-town of St. Leonards, presents an unbroken frontage of about three miles on the English Channel. St. Leonards, on the west, has its aspect full south, while that of Hastings inclines very slightly to the east.

Inland, at a distance of from one and a quarter to two and a half miles from the coast, the town is backed by a continuous range of hills, the crest of which forms the northern boundary of the borough. From this ridge, spurs from the main range of hills branch off to the south, terminating on the coast in bold and rugged cliffs of sandstone at the eastern end of the district. Thus shelter from the winds is afforded to the town on the north and east. Further, the area comprising the borough is itself intersected by a series of hills and valleys, which run mainly north and south; resulting in variations of altitude and exposure, with a wide choice of climate and aspect.

Westward of St. Leonards, in the direction of Bexhill, the country is open and level, with no protecting barrier of high hills nearer than the range of the South Downs.

Thus, from its natural features, Hastings is adapted for invalids of all ages and of many types; but it is chiefly those requiring a sedative climate at all seasons of the year who should be sent here.

Hastings shares with other places on the south coast the advantages of proximity to a large body of water with its temperature influenced by the Gulf Stream. One effect of this is that the severity of winter is so far mitigated that



HASTINGS, OLD TOWN.

prolonged frosts and heavy snowfalls are rare. The winters are, indeed, mild enough for the growth in the open of such plants as the myrtle, the fuchsia, camellia, and lemon-scented verberna. Of the eucalyptus many specimens have attained to the height of thirty feet or more. These evidences of the comparative mildness of the winter season at Hastings serve but to confirm what is very generally recognized as a fact.

What may be less widely known is that the temperature, during the summer months, is not excessive, and that extremes of heat are as seldom experienced then, as extremes of cold in winter. For some years taken singly, as well as for others taken in succession, the amount of sunshine has exceeded that recorded in any other portion of the island. The explanation is that the track of almost all the storm areas which approach Great Britain from the Atlantic lies over the north of Ireland and Scotland, and takes a north-easterly course; so that this south-eastern corner of England is farthest from the centre of disturbance in its passage over the country.

A further reason is to be found in the relative immunity from fogs.

In the year 1911 the amount of bright sunshine recorded was as much as 2,147 hours.

The rainfall averages about 29 inches annually. The most prevalent wind is from W.S.W.

The temperature of spring averages 47·1 degrees.

| | | | | |
|---|--------|---|------|---|
| „ | summer | „ | 60·3 | „ |
| „ | autumn | „ | 51·5 | „ |
| „ | winter | „ | 40·1 | „ |
| „ | year | „ | 49·8 | „ |

The mean daily range is 10·7° (from 44·4° to 55·7°).

Hastings takes pride in its sea front, which is nearly three miles in extent, and sheltered for the greater part of its length by low, sandy cliffs; while it is flanked by an almost continuous line of houses and hotels, so being entirely protected on the north. Hence its attraction for the convalescent, the delicate and the elderly during the winter months. The more bracing part of the sea front is the west—or St. Leonards—end; the Hastings end being the more sheltered and sedative.

Hastings, in comparison with other English health resorts,

whether seaside or inland, is unusually well off for public pleasure grounds. Of these open spaces, three (one of which is of seventy-five acres, and another of forty in extent) may well be described as parks; while the three others are gardens. Notwithstanding their proximity to the sea, trees, grass and flowers flourish in them luxuriantly; the display of flowers in one of them being really remarkable.

While one portion of the large Park is devoted to games and *fêtes*, and much frequented, the rest is rural and quiet. In the gardens, seclusion reigns. The attractions of the sea front, in fact, are so great that these gardens scarcely meet with due appreciation in comparison, and visitors have even been known to leave Hastings in ignorance of their very existence.

The sea bathing is good, and there is a swimming bath, 180 feet long by 40 feet wide, which is reputed to be the largest sea-water swimming bath in the world. The advantages of a tepid salt-water bath, as increasing the value of swimming as an exercise, are not yet fully appreciated, even by the medical profession. In open sea bathing, the low temperature of the water, together with the movement of the waves, tends to induce fatigue in the bather before he has taken as much exercise as he may desire. It is to be regarded, in fact, rather as a means of acting upon the nervous system than as an exercise for the muscles. The mild warmth of the water in a swimming bath, on the other hand, and its calmness, permit the bather to prolong his exercise at will. And, as to that exercise, it should be noted that, while some groups of muscles are insufficiently brought into action by walking, riding and many games, swimming demands the use of all; of some, especially, which are seldom sufficiently exercised under the ordinary conditions of modern life. The reader will scarcely need reminding of the further obvious advantage of a swimming bath, in the independence it affords of season or conditions of weather.

In the same building there are Turkish and Russian vapour, as well as medicated baths, such as iodized ozone, sulphur, and brine. A scheme is now afoot, with every prospect of early fruition, for the installation of baths on an elaborate scale, as at a spa, by which every kind of sea-water treatment will be made available.

The circular tram route, passing through Hastings by the Park, and on to the high ground of the hills to the north, affords an attractive and picturesque drive.

The equability of its climate renders Hastings peculiarly suitable for those suffering from catarrhal affections of the throat and lungs and from chronic diseases of the heart and kidney. Many find that they can winter here as well, to say the least, as in some of the health resorts of southern Europe. It is an excellent halting-place, too, for those returning in the spring from the shores of the Mediterranean. As at other seaside places, asthmatics often derive great benefit from the climate; as do also persons suffering from anæmia and debility, and convalescents from acute disease or surgical operations.

The district is well suited for permanent residence in cases of cured, quiescent, or chronic phthisis; as well as for those who suffer from tuberculous disease of the bones, joints, glands, kidneys or other organs.

As a winter resort for consumptives showing signs of active disease, Hastings is less frequented than formerly; such patients being now widely distributed in the various sanatoria throughout the country. Yet climate and situation make the town eminently suitable for the open-air treatment of the disease.

Other morbid conditions beneficially affected by the air of Hastings are neurasthenia (especially with torpor) and insomnia. Sufferers from chronic rheumatic affections and obstinate neuralgia will often receive much benefit, and facilities are at hand for all kinds of modern electrical treatment. While chronic cutaneous affections usually do well, acute forms of eczema are not likely to benefit, or may even be aggravated. This is apt to be the case, also, in hepatic insufficiency; a condition in which the air of the seaside is often found to disagree.

The climate of Hastings—especially on the high ground at the back of the town, where many of the private schools are situated—is eminently suitable for children. Asthmatic, tuberculous, and neurotic children do particularly well; the air being sufficiently bracing without the risk of over-stimulation.

To sum up, the chief points to be noted about this district are the exceptional amount of sunshine it receives, its freedom

from fog, its small daily range of temperature, and its variety of climate—bracing in character on the high ground, but sedative in the valleys and along the shore.

A. C. W.

For the East Sussex Medico-Chirurgical Society.

Hotels.—Palace Hotel; Alexandra Hotel.

BEXHILL-ON-SEA.

General Characteristics.—This resort on the Sussex coast (distant from London sixty miles) faces due south, and has an elevation of from fifteen to 150 feet above the sea. Of comparatively recent growth (for it is just about “coming of age”), it has the advantages of modernity in planning and appointments, while it has long emerged from the stage of staring crudity. The spirit governing its authorities is judiciously progressive, and their desire to make Bexhill attractive stops short of making it indiscriminately so. The result is an atmosphere of brightness, tempered by a certain daintiness. Bexhill is what the French would call “une petite ville coquette”; and this lapse into French is the more excusable from the fact that the town has not a little suggestion of the Continental resort about it; a lightness and gaiety that are, however, duly and discreetly modified to the requirements of British taste.

Much of this bright and brisk cheeriness it owes—apart from its music, its Kursaal and Colonnade—to the circumstance that, having been deliberately planned, Bexhill is well laid out, with attention to spaciousness in its streets and promenades, and to good taste in its architecture.

The town lies on the eastern side of Pevensey Bay. Its frontage on the Channel extends over five miles.

The sands are extensive, and these, the rocks off the De La Warr Parade, the Down and play-gardens, afford “happy hunting-grounds” for children of small and larger growth.

The part of the foreshore devoted to bathing is clean and almost free from rocks. Tents or cabins, as well as bathing machines, may be hired. A new bathing station has recently been provided on the Central Parade, with comfortable dressing boxes, fitted with shower baths.

The rural surroundings of Bexhill comprise wood and pasture,



Photo by F. J. Parsons.

CHILDREN'S PLAYGROUND, BEXHILL.

lane, cliff and down. If the town is a little new, the neighbouring castles of Hurstmonceux and Pevensey are not—nor is Battle Abbey, nor the site where the Armada beacons blazed.

Climate.—In general terms, the climate is bracing and tonic; during the first quarter of the year, very bracing. Snowfalls during the winter are rare, but Bexhill does not escape the gales common to all parts of the south coast at this season. During the spring months there is less wind, it is usually warm and sunny, and the air is bracing. It is mildly so in summer, when there is abundant sunshine, and warmth tempered by invigorating breezes from all quarters. The last three months of the year are more bracing, with, as a rule, open weather and very few fogs.

Being smaller than Hastings, with wider streets and less natural shelter, Bexhill is less protected, so that, while it is very well suited in the colder months for healthy people or for invalids who are able to take exercise, the infirm should not then be sent here. These more open conditions, on the other hand, render it in summer suitable for a wider category of invalids, as well as for those in robust health.

METEOROLOGY.

Averages of 5 years 1907 to 1911.

| | Sunshine. | Rainfall. | Temperature. | | | | | Humidity. | |
|---------------|-----------|-----------|---------------|---------------|-------------|---------------|---------------|-----------|-----------|
| | | | Mean maximum. | Mean minimum. | Mean range. | Extremes. | | Wet bulb. | Dry bulb. |
| | Hours. | Inches. | | | | Mean maximum. | Mean minimum. | | |
| 1st quarter . | 313·2 | 5·12 | 45·2° | 36·5° | 8·7° | 51·4° | 27·0° | 39·3° | 42·7° |
| 2nd quarter . | 650·4 | 5·21 | 58·1° | 46·8° | 11·3° | 67·9° | 37·7° | 50·3° | 53·2° |
| 3rd quarter . | 646·0 | 5·28 | 66·4° | 54·7° | 11·7° | 73·6° | 45·9° | 58·5° | 62·3° |
| 4th quarter . | 253·6 | 13·63 | 52·0° | 43·8° | 8·2° | 58·3° | 32·4° | 46·5° | 48·0° |
| Year . . . | 1863·2 | 27·78 | 55·4° | 45·4° | 10·0° | 62·8° | 35·7° | 48·6° | 51·2° |

Mean temperature (average of 5 years), 50·4°; mean maximum, 55·4°; mean minimum, 45·4°; mean range, 10°.

Maximum temperature (average of 5 years), 77·5°.

Minimum temperature (average of 5 years), 21·8°.

In 1911 there were 2,069·8 hours of bright sunshine.

Average sunshine (5 years), 1,863·2 hours; average rainfall, 27·78 inches.

Baths and Treatments.—Besides the sea bathing facilities already mentioned, there are available various forms of medical baths, including vapour, hot air, iodine, tannic acid and electrical baths; while treatment may be had by high frequency currents, static electricity, Roentgen rays, radium, ionization, massage, and vibration.

There are several nursing homes in the town which receive medical and surgical cases.

Indications.—(1) Bexhill is specially indicated for (a) tuberculous manifestations of bones, joints and glands, particularly in children. (b) Nervous diseases, including neurasthenia, insomnia, hysteria, and organic nervous diseases. (c) Anæmia. (d) Tropical cachexia. (e) Wasting diseases. (f) Convalescence after acute illness and operation.

(2) It is a suitable place, also, for chronic bronchitis and early cardiac disease from the north, and for early cases of phthisis. It is rare to find a case of acute rheumatism, tuberculous disease (acquired in the town), pneumonia or typhoid fever.

Season.—The best months for a stay at Bexhill are from April to December. The chief season is that of the summer holidays, from July to September. The population is annually recruited by many Anglo-Indians, and visitors from the Continent are numerous—particularly from France. As has been already indicated, the “tripper” element is not encouraged, nor is it in evidence at Bexhill at any time of year. The town has become a favourite educational centre, and is admirably adapted for schools for both boys and girls, of which it possesses a large number.

Amusements.—While the beach minstrel and pierrot type of entertainment is escaped at Bexhill, this resort has attained a reputation for the music provided at the Kursaal, at the Pergola in Egerton Park, and, in bad weather, in the Pavilion. A new bandstand, with a covered terrace—“The Colonnade”—has been constructed on the Central Parade.

Dramatic, as well as musical entertainments, are frequently given.

The town's chief pleasure garden is Egerton Park: thirteen acres of ground, tastefully laid out, with a wide stream winding

through it. The Down, or Common, at the back of the town, forms a recreation ground on which cricket, football, and so on, are played; while there is a "Rotten Row" for riders.

Golfers will find at the east end of the town an eighteen-hole course; on the west side, at Cooden, an eighteen-hole course; with a nine-hole course for ladies and a nine-hole putting course.

There is a croquet club, with five lawns, and a lawn-tennis club, with twenty courts and four courts for children; while there are a dozen or more courts in Egerton Park, which has also a bowling green, with pavilion.

The roads in the vicinity are good for cycling, and easy trips may be made by this means, as well as by drives and walks, to the Sussex villages, old castles and other points of interest in the neighbourhood.

There are meets both of foxhounds and of otter hounds within easy reach.

Subscription to the Kursaal is equivalent to joining a large social club, with reading-rooms, deck, beach garden and an auditorium for theatrical and musical performances. There is also the New Club.

Accommodation.—There are several large hotels of the first class, private hotels and boarding-houses. Most of these are on the sea front, but apartments can be obtained in other parts of the town.

Bexhill attracts an increasing permanent population, and has, indeed, been laid out with special reference to the requirements of private residents. Comfortable houses can be obtained at rents ranging from £40.

C. T.

For the East Sussex Medico-Chirurgical Society.

Hotels.—The Sackville; Hôtel Riposo (residential hotel).

EASTBOURNE.

Eastbourne (population 52,000) is distinguished by its comparative newness. Of all our seaside resorts of considerable size, it is by far the most modern. Hence the system of town planning has been in accordance with modern ideas; a result, the attainment of which has been greatly aided by the fact that virtually the whole area on which the town stands

is the property of two owners. This ownership, in conjunction with up-to-date building by-laws, has led to the town's being laid out with streets and roads of adequate width, and with due regard for considerations of health and beauty.

There are, throughout the borough, but nine persons to each acre; or taking the inhabited part, but forty-five to the acre; any overcrowding of sites being thus obviated. Another distinctive feature of Eastbourne is the great number of trees, of which there are thousands, both in the roads maintained by the Corporation and in private gardens surrounding the houses. As might be inferred from the small number of persons per acre throughout the town, there are large open spaces, both public and private.

The greater part of the borough is built upon, and lies on the eastern slope of the South Downs; thus being on hard chalk; while the remainder, in the east, is on an outcrop of Greensand, and, to a small extent, on clay.

There is a frontage of some miles on the sea, with a level parade nearly two miles in length; above which other walks and terraces are arranged.

Devonshire Park, one of the large open spaces, is private, but the public are admitted on payment, and a constant succession of entertainments is provided, both indoor and out. The most prominent event of each year in this park is the South of England Tennis Week in September.

The bathing is perfectly safe, the beach below the half-tide line being of sand, and above it of flint pebbles.

Owing to the situation of the borough on the promontory of which Beachy Head forms a part, the climate is almost insular. The extremes of heat and cold are thus avoided. The mean annual temperature averages about 50° F. According to the Meteorological Society's statistics, the amount of sunshine recorded in Eastbourne is comparatively great. In three of the last twelve years, including 1911, Eastbourne has headed the list of the meteorological stations in Great Britain for total sunshine, and it is rarely lower than fourth or fifth on the list. This is probably to be credited to the open south-east aspect. The prevailing wind is south-west, but its force is diminished by the situation of Beachy Head to the south-west of the town.

The exposure of the town to the south-east, and its position on the eastern slope of the South Downs, give it a rather bracing climate for a south coast town. This bracing quality is, in itself, the characteristic which makes it suitable for invalids, and which, in particular, renders it a satisfactory resort for convalescents and people who have been overworked, rather than for those with acute illness, such as acute tuberculosis. Eastbourne is probably not suited for advanced cases of tuberculosis or for any other lung affection.

The presence of numerous schools, with their playgrounds, adds to the number of large open spaces, and testifies to the faith reposed in the healthiness of Eastbourne. In spite of the large number of children in the schools, the zymotic death rate is, as a rule, only one-fourth to one-third of England and Wales generally.

Especial attention is given to outdoor amusements. There is a local hunt, three eighteen-hole golf courses, and a large cricket club, with a ground on which County matches, those with the M.C.C., and others, are played regularly.

W. G. W.

Hotel.—The Grand.

VENTNOR, ISLE OF WIGHT.

WHILE the Isle of Wight in general is healthy, and possesses several charming holiday resorts, the Undercliff district is that which offers special advantages as a winter health resort. This beautiful territory, varying in breadth from about half a mile to a mile, and sloping to the sea along its whole length, stretches for six or seven miles along the southern coast of the island. The cliff from which the district takes its name forms its northern boundary, behind which rise, to a height of between 400 and 800 feet, the Downs—a range of hills the extreme steepness of which lends them an appearance of even greater altitude. By these the region of the Undercliff is completely protected from northerly and north-easterly winds, and we find pansies and roses here in January; while, in most years, the early primroses may be gathered before Christmas.

Towards the eastern end lies Ventnor, a town of about 5,000 inhabitants; the first characteristic of which to strike the visitor is the precipitous nature of the streets running from north to south; those from east to west, however, being fairly level.

While well protected from the north, Ventnor is fully exposed to the south-westerly winds. In winter they often amount to gales; but in summer these breezes mitigate the heat, and render Ventnor a much cooler place than London at that season. The soil is porous, being composed chiefly of chalk, with chalk marl, and Greensand on a bed of Gault; and the ground is soon dry after rain. Formerly, a matter of much complaint was the dust on the country roads, which was stirred up by the south-westerly wind prevailing in summer; but modern methods of treating the road surface have abated this nuisance.

Mortality and Morbidity.—The death rate of Ventnor is 14·62 per 1,000; but this is inclusive of visitors; subtracting them, the death rate for inhabitants is 10·1 (the average for



VENTNOR.

five years, 1906–1910, inclusive). A visitor is counted as an inhabitant after twelve months' residence. For pulmonary tuberculosis, the death rate among the inhabitants during the same period was 1·04 per 1,000 living; the English mortality rate from pulmonary tuberculosis, according to the Registrar-General, being 1·22. Here, again, the Ventnor rate is swollen by the inclusion of visitors after twelve months' residence in the town.

Influenza has been exceedingly rare for the last five or six years, although many patients convalescing from the disease have come to Ventnor to recuperate.

To the large amount of lime salts in the water is due a certain prevalence of constipation.

Meteorology.—The outstanding features of the climate are : (1) the large amount of sunshine; (2) equability of temperature; (3) the protection from cold winds, and (4) the dry nature of the soil and air.

The amount of sunshine in the winter months has frequently exceeded that of any other station in England. For the twenty years 1887–1907 (both inclusive, but omitting 1892, when there were some changes of observers), the average number of hours of bright sunshine from October to March, inclusive, was 514·3.

The mean daily range of temperature for the whole year is 10·22°; for the winter months, 7·88°, and for the summer months, 12·07°.

The winters are warm and the summers cool.

That the winters are warm is due to several reasons, among them the effect of the Gulf Stream, which profoundly influences the temperature of Ventnor. There is, moreover, complete protection from north winds. Again, the perpendicular face of the Downs catches the sun's rays, which are radiated back to the town and, this process continuing through the night, equability is maintained.

During the ten years, 1902 to 1911, inclusive, on five days only did the thermometer fail to rise above 32° F. during the day.

The summers are cool, partly because of the prevalent south-westerly breezes, and partly because the Downs to the north-west hide the sun early in the evening. The greater part of the town is in shadow by six o'clock.

The maximum summer temperatures, as compared with Regent's Park, are—June : Ventnor, $63\cdot4^{\circ}$; Regent's Park, $68\cdot1^{\circ}$. July : Ventnor, $67\cdot9^{\circ}$; Regent's Park, 71° . August : Ventnor, $67\cdot9^{\circ}$; Regent's Park, 70° .

Subjoined is a summary of meteorological observations.

Monthly mean temperatures, for five years, 1907 to 1911—

Maxima.—January, $45\cdot16^{\circ}$; February, $46\cdot42^{\circ}$; March, $48\cdot88^{\circ}$; April, $52\cdot62^{\circ}$; May, $60\cdot3^{\circ}$; June, $63\cdot64^{\circ}$; July, $67\cdot44^{\circ}$; August, $68\cdot62^{\circ}$; September, $65\cdot12^{\circ}$; October, $59\cdot52^{\circ}$; November, $51\cdot56^{\circ}$; December, $49\cdot02^{\circ}$.

Minima.—January, $37\cdot14^{\circ}$; February, $37\cdot32^{\circ}$; March, $38\cdot28^{\circ}$; April, $41\cdot34^{\circ}$; May, $47\cdot96^{\circ}$; June, $52\cdot0^{\circ}$; July, $55\cdot1^{\circ}$; August, $57\cdot08^{\circ}$; September, $53\cdot46^{\circ}$; October, $50\cdot74^{\circ}$; November, $42\cdot3^{\circ}$; December, $41\cdot52^{\circ}$.

Extreme maximum temperature for past ten years, $86\cdot6^{\circ}$, on August 10, 1911.

Extreme minimum temperature for past ten years, $19\cdot8^{\circ}$, on December 30, 1908.

Longest frost, from January 26 to February 20, 1895, when it froze every night.

Driest year, 1908, with $21\cdot39$ inches of rain.

Wettest year, 1903, with $37\cdot71$ inches of rain.

Greatest number of days on which rain fell, 198, in 1903.

Smallest number of days on which rain fell, 160, in 1908.

Mean annual rainfall (20 years), $27\cdot99$ inches.

Mean annual sunshine (12 years), 1,754 hours.

From what has been said, it will be seen that the winter climate of Ventnor is soft and warm. It is one well suited to patients suffering from forms of subacute disease in which much rest in the open air is advisable. The large amount of sunshine permits of patients being out of doors for five or six hours in midwinter; and, as the better class of houses generally have roomy balconies facing the south, it is possible for them to remain in the open air for a still longer period, in their beds, if necessary. In bright weather these balconies are veritable sun-traps, and it is not uncommon to hear them complained of as being too hot, while the thermometer on the other side of the house may be at about freezing-point.

Among patients who benefit greatly from such open-air life in bed are those suffering from pernicious anæmia during the

febrile hæmolytic attacks; from Graves's disease in its active stages; from tuberculous hip- or knee-joint in their subacute stages, and from similar conditions where much rest is indicated. But the very mild climate is possibly most helpful in those phases of neurasthenia in which insomnia and irritable weakness form a prominent feature of the case. The patient ought to have rest, but finds quiescence intolerable owing to the sensations of restlessness associated with the hypertonicity of his muscles. This condition is characterized by greatly increased deep reflexes and by extreme disinclination to remain recumbent. Speak to such a patient when he is lying down, and, though he may remain on his back, he will probably keep his head up by muscular action alone, not at the time realizing the fatigue he is thus imposing upon himself. Ventnor is a place at which it is easy for the patient to acquire that amount of muscular relaxation out of doors which will enable him after a few days to lie quietly and obtain the rest so essential in this stage of his ailment. It is not a good place, on the other hand, for the second part of the treatment, when the endeavour is to get the patient braced up once more for the battle of life.

Ventnor is an admirable winter resort, also, for patients with a tendency to bronchitis, who, in a climate less mild, would be compelled to spend many of the winter months indoors in order to escape their attacks; for those suffering from bronchiectasis, in a considerable number of whom the morbid secretions here dry up; and for the milder form of chronic Bright's disease. All these patients benefit by being out of doors as much as possible, but there are few, not many, places in England where, in the winter, they can rely on accomplishing this with safety.

From the above classes must be excepted cases in which cardiac dyspnœa is a prominent feature. The rampart of the Downs—most prominent among the causes of the salubrity of the climate—is, for them, not a defence, but a peril; while the steepness of the streets in itself forms an absolute contra-indication, and will continue to do so until the local authorities have solved the problem of connecting the various levels by means of a lift or otherwise. This done, as it probably will be before long, and the place will be eminently suitable for these patients.

Many asthmatic patients have felt themselves so much benefited by a short stay at Ventnor that they have become residents; for the different levels offer a sufficient variety in climate to be appreciated by an asthmatic.

The great reputation which Ventnor formerly possessed as a place peculiarly adapted for patients suffering from pulmonary tuberculosis, appears of late years to have been somewhat overlooked. Comparatively few ordinary visitors with this disease now spend their winters there: and this although the Royal National Hospital for Consumption (within a mile from the town) always has a long list of patients awaiting their turn for admission. The ease with which the Swiss resorts can now be reached, and the spread of the sanatorium treatment at home have, without doubt, been mainly instrumental in bringing about this result; yet there must still be many phthisical patients who would do better in a place like Ventnor than either in Switzerland or in certain of our English sanatoria. Cases of comparatively advanced disease, scarcely suitable for the Alps, or in which the patient has wearied of, without benefiting by the strict sanatorium régime—often quiet down in Ventnor. It is possible that the cause of this is chiefly mental. No doubt the mild, warm climate is helpful; but it must also be considered that not every patient will thrive when cut off from friends; and there are some who would undoubtedly do better in rooms at a place like Ventnor, where they can choose their own society. Laryngeal cases, too, often lose their hard, irritable cough in a climate so much milder than that of many of our home sanatoria. Indeed, cases with irritable cough from other causes do well here.

In this connection, it should be stated that the hotel and lodging-house keepers have become very much alive to the fact of the contagious nature of the disease, and many of them will not receive visitors suffering from it. The local members of the profession are, of course, fully informed as to the houses to which they may send their consumptive patients, as well as to where to send the non-consumptive, with complete confidence that they will run no risk of infection. Without doubt, ignorance on these points on the part of the medical profession in England has done harm to Ventnor. It is all too frequently stated that Ventnor is full of consumption and



Photo by J. Downing.

VENTNOR FROM THE SEA.

that it is dangerous for patients to go there. This is not a fact.

Finally, it may be well to keep in mind that the summer here is characterized by comparative coolness, and that Ventnor may be confidently recommended as a very pleasant summer resort, where there is good bathing and boating, as well as much to interest the geologist, the botanist and the artist.

T. A. ROSS, M.D.

Hotel.—Royal Marine Hotel.

BOURNEMOUTH.

BOURNEMOUTH is one of the most important winter seaside resorts in Great Britain. The first feature likely to strike a new arrival in the town is the great number of trees—of pines especially ; while scarcely less notable is the number of gardens, both those belonging to the public, and the private grounds in which stand villas and detached residences.

The fame which Bournemouth enjoys for a mild winter climate was originally derived from the stillness of the air in the central, or valley district, which, in the “ ’sixties,” comprised virtually the whole of the town. There is a large public garden, with the shelter of many trees, in the middle of this area, which is open to the south, but on other sides protected from the wind. It is thus admirably adapted to serve as a promenade, even in the depth of winter, for the most delicate of invalids.

To the east rises the bold “ East Cliff,” now, perhaps, the best known and most fashionable quarter of Bournemouth. Here, too, the trees are numerous, and thickly enough set to afford shelter from the wind without shutting out the sun. Still mild in this quarter, the climate is here not without a bracing element.

The West Cliff, on the other side of the valley, has a higher elevation and is much more open and exposed. Upon it lies the newer part of Bournemouth proper. Though by no means treeless, this district is decidedly more airy, and sunnier, than either of the two already dealt with. Both positively and comparatively, in fact, it may be described as bracing.

Lying a little farther to the west are Branksome Park and Chine, comprising an almost virgin pine-forest, which is held to be particularly suitable for convalescents and for sufferers from neurasthenia and insomnia.

Opposite, at the eastern extremity of the town, is Boscombe, the air of which is distinctly drier and more bracing than that of the other districts.

The whole country in and about Bournemouth has a highly pervious soil, consisting, for the most part, of gravel overlying a deep layer of sand.

Reference has already been made to the town's gardens and trees, and it may interest the statistically-minded to learn that of the 5,850 acres now included in the borough no less than 694 acres are reserved for parks and pleasure grounds. Thousands of young fir trees are planted annually, so, as a local publication remarks, "there need be no fear of Bournemouth losing its reputation as the City among the Pines."

Therapeutic indications for Bournemouth are:—

Broncho-pulmonary: localized tuberculosis in the first stage; arrested phthisis; phthisis accompanied by bronchial catarrh; chronic bronchitis. Renal: chronic albuminuria and calculous disorders. Gastro-intestinal: chronic gastric catarrh with considerable debility. Nervous system: any irritable condition—especially insomnia and neurasthenia. General: convalescents from acute disease, delicate persons generally and especially those of advanced age. Contra-indications: any conditions, in the sick or the sound, in which the person concerned is likely to feel "unstrung" unless stimulated by a distinctly cold and keen air.

As to outdoor recreations, a country of singular beauty invites to excursions in many directions and, of such outings, motor drives in the New Forest are among the most attractive. Steamers ply during the summer to various places both on the English and French coasts. There are the usual golf courses and tennis grounds. Throughout the year, in fine weather, an orchestra—one of the best in England—plays in the Winter Gardens.

For indoor amusement there is a theatre, a hippodrome, and several lecture halls. Accommodation ranges from luxurious hotels and handsomely furnished residences to apartment and lodging-houses and the diminutive villa.

Many British and, of late, foreign families spend the winter at Bournemouth, attracted by the quietude of the place, its immaculate cleanliness and its genial climate: a climate, it

may be noted in this connection, not subject to the abrupt variations in temperature characteristic of that of the Riviera.

Accurate meteorological observations are now made at Bournemouth, and some figures from the registrar's report may prove of interest :—

Mean annual sunshine (13 years), 1667·5 hours—for 1911, a very sunny year, 2,147 hours. Mean annual rainfall, 31 inches; monthly mean temperatures (20 years), January, 40·5°; February, 40·9°; March, 43·3°; April, 47·6°; May, 53·2°; June, 58·2°; July, 61·7°; August, 61·7°; September, 58°; October, 52°; November, 46·9°; December, 43·1°.

T. F. G.

Hotels.—The Royal Bath Hotel; The Chine Hotel (Boscombe); Hôtel Mont Doré; Hôtel Métropole.



Photo by H. M. Cooper, Lynton.

[To face p. 181.

THE CASTLE ROCK, LYNTON.

THE COASTS OF SOMERSET, DORSET,
DEVON AND CORNWALL, WITH THE TABLE-LANDS
OF DARTMOOR AND EXMOOR.

GENERAL SURVEY.

Climate.—The counties of Somerset, Dorset, Devon and Cornwall form, broadly, the south-western peninsula of Britain. This peninsula reaches farther west than any other part of England and Wales, and farther south than any other part of the British Islands, except the Scillies, which belong to it. Surrounded by wide sea and washed by the Gulf Stream, its coast is remarkable for equability, relatively warm winters, cool summers and slight daily variation of temperature. Cornwall, generally, is the most equable part of England and Wales, while the Scillies are probably the most equable place in Europe. The temperature of the sea, which has much to do with this, is higher in December between St. Ives and Padstow than anywhere else in the United Kingdom. Another important characteristic is sunniness; the Cornish, Devon and Dorset coasts have more sunshine than any equal stretch of coast in the United Kingdom. See Tables I and II (pp. 200–201).¹

Advantages.—The whole coast enjoys the following special advantages :—

Great healthiness—relatively low general death rate, infantile death rate, and death rate of children under five.

Remarkable frequency of advanced age; longevity is certainly promoted—partly, no doubt, by the equability of the climate, which must lessen the risks of the old.

Comparative rarity of scrofulous disease; it is interesting to observe, in connection with this, that the Devon cattle are considered to be remarkably free from tuberculosis—doubtless, in part, because the mild winters allow of their being much out of doors all the year round.

¹ Also Bartholomew's Atlas of Meteorology.

Table III illustrates these features.

It is, moreover, a region of singular interest and beauty.

NATURAL DIVISIONS.

For further general description the area may be divided into ten districts :—

| | |
|-------------------------------------|-----------------------------|
| The Somerset Coast north of Exmoor. | The South Cornish Coast. |
| Exmoor and its Coast. | The South-west Devon Coast. |
| The North-west Devon Coast. | Dartmoor. |
| The North Cornish Coast. | The South-east Devon Coast. |
| The Scillies. | The Dorset Coast. |

The **Somerset Coast north of Exmoor** is a level expanse little above the sea, except for the local rises on which Clevedon and Weston-super-Mare are partly built. It is moderately bracing and affords good summer and autumn quarters.

Exmoor, strictly speaking, is the wild tract of moorland which, in West Somerset and North-east Devon, occupies the summit of the high range of hills that borders the Bristol Channel. It stretches for miles in desolate rolling uplands, covered with coarse grass and heather, and cleft here and there by deep valleys, down which tumbling rivers find their way to the lower country.

But, for climatological purposes, it will be well to consider the whole range together, as it is structurally and geologically one. It forms an oval, forty miles by twelve, lying nearly east and west, over 500 feet in height, rising centrally over 1,000 feet and culminating in Dunkery Beacon (1,707 feet) above Porlock. It is a country of steep hills and rapid streams, of open heights and superbly timbered valleys, of shales and sandstones (Devonian), with moderate rainfall on the coast, but a very heavy one on the higher ground (63 inches at Challacombe, 1901–1904). The soil dries quickly, sunlight is abundant, the air is bracing, but in shelter—of which there is plenty—it is warm and equable. In summer the summit has an invigorating climate, but in winter it is bleak, misty and storm-swept.

Where there is exposure to west and south-west gales phthisis

is commoner than in the more sheltered situations. The north coast has a remarkably low phthisis-mortality.

The centre of Exmoor sport is **Dulverton**, lying amid superb scenery. To it and to the moor round it may be sent, from April to October, gout, rheumatism, bronchitis, asthma and phthisis;—neurasthenia throughout the year. Delicate people pick up wonderfully in fine weather. Accommodation is cheap and clean, sport excellent and inexpensive—much of it suitable for invalids. Fishing is good and easily obtainable; there are stag-hounds, fox-hounds, harriers, otter-hounds and badger-hounds, while reliable horses can always be hired at reasonable rates. The rainfall at Winsford is 53 inches (1902–1910).

The **North-west Devon Coast** may be said to be intermediate in its character between the coast of Exmoor and that of North Cornwall.

The **North Cornish Coast** is perhaps the most bracing part of the area. It is warm and fairly equable—very equable at Newquay—with a considerable rainfall but a rapidly drying soil, a good deal of humidity, much sunlight, bracing air, bare wind-swept heights and richly wooded hollows in shelter. Anæmia is uncommon and cases soon regain colour. But rheumatism and neuralgia are common, and are not benefited.

The **Scillies** are the warmest and most equable of the districts. Their rainfall is moderate and the soil dries quickly, but there is much humidity; sunshine is abundant, the air is relaxing and there is much wind and storm; exposed heights are bare and treeless, whilst in shelter vegetation is luxuriant and semi-tropical. The islands are of value in scrofulous disease, in nervous breakdown from overwork, and for rickety and delicate children; children find the sands an unsurpassed playground. But anæmia of a marked kind is common.

The **South Cornish Coast** presents a decided contrast to the north. The climate is relaxing, warmer and generally more equable; it has more rain, on quickly drying soil, considerable humidity, much sunlight, bare heights and luxuriant valleys. Bronchitis derives marked benefit. Sir Joseph Fayrer thus put his own case: “The result has been so satisfactory that I feel it a duty to record my experience and call attention to a health resort which is perhaps too little known, but which—if appreciated as it deserves to be—might prove of great benefit

to many . . . though my remarks are limited at present to Falmouth, I believe they apply almost equally to other parts of the southern aspect of Cornwall." The climate is particularly useful in dry, irritable conditions of the larynx and bronchi. But it cannot be recommended for rheumatism or neuralgia.

The **South-west Devon Coast** is relaxing, warm, humid, equable, with considerable rainfall and south-westerly exposure to the Channel gales.

Dartmoor is a granite table-land, nearly in the centre of South Devon, covered with grass, heather and peat, about twenty-four miles by seventeen, rising abruptly to a general height of over 1,000 feet, often of 1,500 feet and, in its highest points, exceeding 2,000 feet. It is a desolate, undulating expanse, not without a weird charm of its own at certain seasons; broken here and there by tors (masses of granite crowning the hills) and giving rise to numerous rivers with valleys of great beauty. The Dart valley is particularly fine.

Many spots on the moor form, in summer, pleasant holiday centres, cooler than the surrounding country, with bracing air and beautiful views. No district in England has such extensive remains of the neolithic age and, in search of them, enjoyable excursions can be made. Its rivers offer excellent fishing. But in winter it is wholly unsuited for invalids, except in such sheltered places as Belstone and Chagford, where phthisis does well all the year round. Between these sheltered spots and the wind-swept heights a sharp distinction should be drawn.

The climate of **Princetown** may be taken as typical of the summit. It is the "Siberia of the South-west." In 1906 there were 305 rainy days, 81.52 inches of rain and 100 foggy days. The mean annual maximum temperature is about 58°, the mean annual minimum about 38°; the daily range, 12.7°; humidity, 87.9; "sunshine not registered, but precious little of it!" Spring is cold, usually windy, and vegetation is about six weeks later than on the lowlands; summer short, practically limited to July and August—sometimes September as well—and very variable as to wind and wet; autumn generally damp, windy and rainy; winter windy, snowy and sometimes extremely cold. Yet the district is healthy and old age frequent.



Photo by Mr. J. S. Amery, Ashburton.]

[To face p. 184.

ON THE WEST DART, NEAR SHERBERTON.

Phthisis seldom originates on Dartmoor, but, when it does, is apt to be attended by hæmoptysis; cases sent to the summit in July and August benefit if the weather is fine and dry, but, if not, do badly. Scrofula is said to do remarkably well among the inmates of Dartmoor prison. Pneumonia and pleurisy are common. Nephritis is rare. Sleeplessness is relieved and anæmia improves in fine weather. Cases which must not be sent to the summit are: bronchitis, asthma, pleurisy, phthisis (except in fine weather in summer), all renal cases, all cardiac cases, rheumatism, rheumatoid arthritis, gout and neuralgia.

The more sheltered aspects of Dartmoor are illustrated by **Chagford**. It stands 500 feet up the north-eastern slope, on gravel over granite, protected from westerly gales. It is an excellent summer resort. Children do well, and cases of anæmia and insomnia improve. Phthisis is uncommon, tends to run a slow course, and cases do exceptionally well both summer and winter. Dr. C. H. Berry's Dartmoor Sanatorium is close by. Tuberculous joints are very rare, and cases sent improve. The general death rate is only 12 per 1,000 and half the deaths occur over 60. Bronchitis and asthma are rare, but pneumonia is not. Acute rheumatism is seldom met with. Unsuitable are cardiac cases (because of the hills) and cases of rheumatoid arthritis.

Comparatively exposed places, making good summer quarters, are **Okehampton**, under the northern escarpment of the moor, but with its residential quarter spreading up the hill front with bracing air and wide outlook, useful in neurasthenia and insomnia; **Moretonhampstead**, on its eastern shoulder, where scrofulous cases do well in summer; **Haytor Rocks**, farther south, and **Bridestowe**, near its north-western angle.

Amongst sheltered places should be mentioned **Belstone** (between Okehampton and Chagford), where Dr. Gwynne's Sanatorium for phthisis gives excellent results.

The **South-east Devon Coast** has a very remarkable climate, largely owing to the shelter it receives from Dartmoor and its spurs on the west, the Blackdown hills on the east, and the plateau of Mid-Devon to the north. Its soil is dry, rainfall comparatively light, sunshine abundant, storms infrequent, humidity moderate, air warm and equable. The hills are less

bleak than those in more exposed districts, the valleys often broad and mostly well timbered, much of the surface level. It includes Paignton, Torquay, Teignmouth, Dawlish, Exmouth, Budleigh Salterton, Sidmouth, Seaton and Lyme Regis.¹

To the advantages, common to the whole area, in which it fully shares, it adds these :—

Comparative rarity of acute rheumatism; beneficial effect on heart disease; beneficial effect, at some places, on chronic rheumatism, asthma and phthisis; comparative rarity of bronchitis and emphysema, with marked benefit to imported cases of bronchitis; comparative rarity of acute nephritis and benefit to imported cases of chronic nephritis; comparative rarity of insomnia and beneficial effect on imported cases.

All reports agree that acute rheumatism is very uncommon, and there can be no doubt of their correctness.

Those who are acquainted with the course run by cases of heart diseases (valvular or not) sent to this district, are agreed that they do remarkably well. In the present unsatisfactory position of knowledge regarding cardiac prognosis, such opinions can only be based on impression. But there are considerations which may be adduced to support this impression. For instance, cases with recurring dropsy seem less common here than in London.

Again, the infrequency of acute rheumatism lessens the risk of further valvular injury; while the rarity of bronchitis and emphysema tends to maintain an unembarrassed pulmonary circulation, and so to prevent one well-recognized cause of general œdema. The warmth and equability of the climate tends to protect the kidneys from secondary or intercurrent disease and, therefore, the heart from the additional burden of arterial high tension. At the same time, the ready access in most of the health resorts, both to level walks and to gradients of every degree, makes exercise of the right sort easily attainable; while the shelter from wind, the quickly drying soil, the general absence of entirely wet days, afford obvious advantages. The baths at Sidmouth provide the patient with "Nauheim treatment," and good results are reported from their use.

¹ Lyme Regis is just in Dorset, but climatically belongs here.

The severe crippling rheumatism, often seen in London, seems decidedly less common in this part of Devonshire, and the effect of the climate is favourable to imported cases. Exmouth, however, is not suitable.

Phthisis is well known to improve and become arrested in properly chosen situations in the district, whose early repute, in fact, rested upon this circumstance. But one condition has to be borne in mind: that the patients must not be sent to the actual sea front, but that they should be placed in shelter, as they were placed when this district first earned its reputation for the cure of the disease. It is a good many years since attention was drawn, by Dr. A. Ransome and others, to the injurious effect on phthisis of close proximity to the beach in various parts of England, and it is extraordinary how their warning is constantly neglected by the profession.

The Dorset Coast, except at Weymouth and Swanage, is as yet little used as a health resort.

To recapitulate broadly—the area presents a variety of valuable climates and is almost everywhere very healthy and conducive to longevity. Though nowhere, perhaps, so invigorating as are the eastern shores of England, it is very bracing on the North Cornish coast, and moderately bracing on the North Devon, Somerset, and Dorset coasts. South Cornwall, on the other hand, is decidedly relaxing and Southern Devon cannot be described as tonic. South Cornwall, however, owing to its moist, sedative, equable climate is, in such sheltered places as Falmouth, exceedingly valuable for chronic bronchitis, particularly the dry, irritable varieties of it; South-east Devon shares in this advantage. South Cornwall and all Devon are useful in insomnia. From its peculiar shelter, very moderate rainfall, pervious soils, equability and sunniness, the South-east Devon coast is also specially beneficial in chronic heart disease, chronic albuminuria and (in situations protected from westerly gales) in phthisis. All Cornwall, however, should be avoided by rheumatic patients, probably because of its considerable rainfall and humidity, and the whole North Devon Coast also seems unsuitable for them. Asthma is greatly benefited at certain places to be presently specified.

Scenery and Associations.—It is impossible in a few lines to

deal adequately with the scenery and associations in which this area is so rich; yet to ignore them would be to overlook their importance as a link with practical climatology. Besides the pleasant shores of Somerset—Pym's county and Blake's—with their cheery outlook down Channel and across to the Welsh hills, it includes the Exmoor range with its beautifully curved and coloured headlands, its glorious views over the "Severn Sea," its thickly timbered valleys and broad, breezy summits—the land of the red deer and of *Lorna Doone*; the unique charm of Clovelly; the noble coast of North Cornwall, overlooking the wonderful blue of the Cornish sea, where still linger the legends of King Arthur; the "waste Land's End"; many-coloured Kynance; the wooded reaches of the southern rivers; Plymouth and Tavistock, with memories of Drake, and, under Dartmoor, the upper windings of the Tamar that Turner praised and painted; Dartmoor itself, with its bold tors and strange relics of forgotten ages; Torbay, where William of Orange landed; Lyme Regis, whence Monmouth started on his luckless enterprise; the warm, red cliffs of South Devon, broken by green flats and shining rivers, and the whiter walls of Dorset, ending, after many breaks, beside the quiet bay in which, a thousand years ago, they looked down upon the first of English naval victories.

PRINCIPAL COAST RESORTS.

Clevedon is a sunny little town, standing partly on a limestone rise on the Somerset coast, looking down the Severn and over to the Welsh hills, bright with trees and possessing a mild, restful climate.

Weston-super-Mare stands on the southern slope of a wooded hill, which shields it from northerly winds, and looks down Channel to the Atlantic. Its popularity is shown by the doubling of its population (24,000) in summer, and its healthiness by its numerous schools and by the Royal West of England Sanatorium with 3,000 patients annually. The expanse of sandy mud left uncovered at low tide is absolutely without unhealthy influence.

The rainfall is only 29·4 inches (1901–1910), rainy days 160 (wholly wet days rare), soil quick-drying, humidity only 78

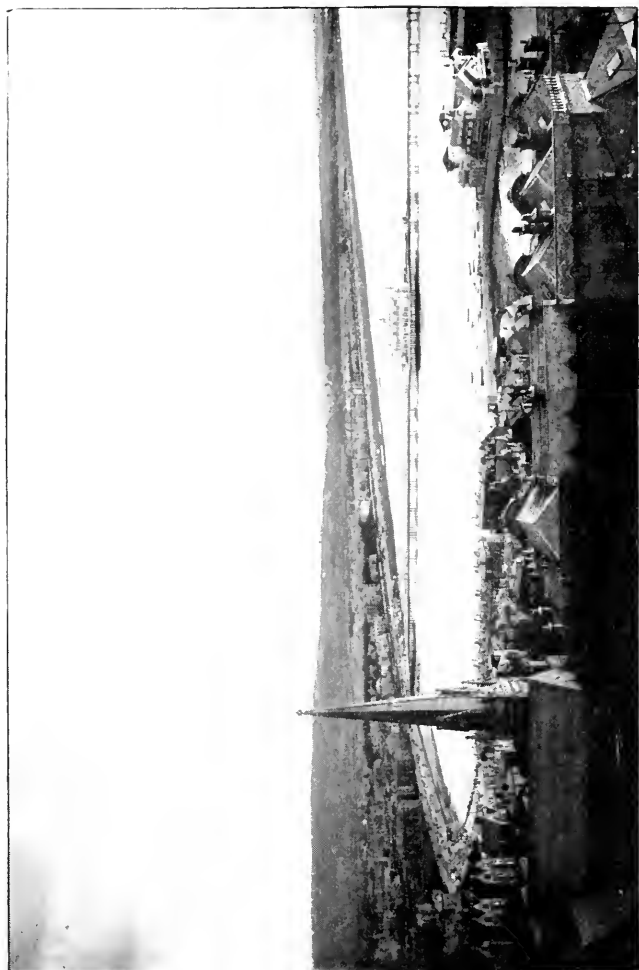


Photo: T. Ernest Magfordlane, Weston-Super-Mare.]

WESTON-SUPER-MARE.

[To face p. 188.

per cent. sunshine 1,577 hours, fog, snow and severe frost uncommon. Spring is windy; otherwise the climate is mild, dry and equable. The daily range of temperature is $11\cdot9^{\circ}$; the monthly means :—

January, $41\cdot2^{\circ}$; February, $40\cdot9^{\circ}$; March, $43\cdot6^{\circ}$; April, $47\cdot7^{\circ}$; May, $53\cdot6^{\circ}$; June, $58\cdot4^{\circ}$; July, $62\cdot1^{\circ}$; August, $61\cdot2^{\circ}$; September, $58\cdot0^{\circ}$; October, $52\cdot7^{\circ}$; November, $45\cdot2^{\circ}$; December, $42\cdot5^{\circ}$.

The general death rate is only 12·79 per 1,000, zymotic rate ·58; 33 per cent. of all deaths occur at seventy and over. Weston may be recommended for delicate children, especially from India, the anæmic and scrofulous; for convalescents and cases of neurasthenia, nervous breakdown, chronic albuminuria and chronic bronchitis. Unsuitable are acute and hæmorrhagic phthisis.

There is a beautiful two-mile promenade, fine piers, pleasant woods, firm sands, excellent golf, tennis, bowling, archery, croquet, good music, delightful excursions and, in summer, sea trips.

Hotel.—Royal Hotel.

Minehead lies mostly on level ground under the north-eastern declivity of Exmoor, screened from south-west, west and north-west, but open to north-east. Its climate seems to deserve more attention than it has received. The rainfall is thirty-six inches on quickly drying soil.

Neurasthenia, insomnia, cardiac cases (especially those with restlessness and irritability), bronchitis and asthma, benefit. Phthisis, unless advanced, improves, and the district is remarkably free from it.

The neighbourhood is beautiful. Minehead is a favourite centre for members of the Exmoor Stag Hunt.

Lynton and Lynmouth, taken together, form one of the loveliest places in England. Both are exposed to north and north-east, but are otherwise sheltered. They are, however, warm and equable. In summer Lynton is cool and fairly bracing. The soil is dry, the rainfall forty-three inches, and sunshine is abundant. Phthisis and other tuberculous diseases are uncommon. It is unsuitable for advanced phthisis, bronchitis, asthma as a rule, heart disease and rheumatism. There are fine drives over Exmoor and steamer excursions along the coast.

Hotels.—At Lynton: The Valley of Rocks Hotel; Bath Hotel and Boarding Establishment. ^{At Lynmouth}

At Lynmouth: The Tors Hotel; Bevan's Lyn Valley Hotel.

Ilfracombe, the chief health resort of North Devon, is sheltered under the steep hills which form the western buttress of Exmoor, in a break of the coast and the valleys running back from it. It mostly escapes the westerly gales, but is open to the north. Yet, with this northerly aspect, which makes it invigorating, it is far from cold, and even in winter is one of the most equable places in England. The mean annual maximum temperature is 57° , mean minimum 44.9° , mean daily range remarkably low— 8.4° . Thus autumn and winter are mild, and summer cool. The soil is dry, rainfall (1901–1910) 37.46 inches, rainy days 198, sunshine abundant—1,790.4 hours (1909–1910), fog rare.

Ilfracombe is an excellent place for all respiratory cases (except phthisis), scrofula, convalescents from acute diseases (especially with a phthisical family history), and old people. Unsuitable are cases of phthisis, advanced heart disease, Bright's disease, anæmia, neurotic people, and the rheumatic and gouty.

The country round is beautiful, and delightful walks and drives can be taken; steamer trips to Lundy and Clovelly are available in summer; there is a nine-hole golf course.

Hotels.—The Ilfracombe Hotel; The Cliffe Hydro Hotel.

Westward Ho and **Northam** lie in a district of great beauty, which Kingsley has made famous. Their climates are by no means identical: Westward Ho is on the sea, facing north and open to west, though screened from south-west; Northam is farther inland and to some extent sheltered from sea-winds. Summer is cool and bracing, winter mild.

Lung complaints do well, Westward Ho having not a single death from phthisis on record. Nervous cases with insomnia improve at Westward Ho, and cardiac cases do fairly well at both. Westward Ho does not agree with eczema, but Northam does.

The golf links at Westward Ho are the finest in England.

Boscastle and **Tintagel**.—For bracing air and grand coast scenery, this district may be confidently recommended in the summer months. Tintagel stands high and is wind-swept



Photo by Bennetto, Newquay.

NEWQUAY, FISTRAL BAY.

[To face p. 191]

in winter, when mists are not infrequent, but the air has been shown to be sterile. Boscastle is much more sheltered. In summer it is valuable for nervous breakdown from overstrain, and for tuberculous cases; phthisis is rare, and imported cases do well. On the other hand, rheumatic affections and valvular heart disease are common.

Newquay is a fast-rising health resort on the most equable part of the North Cornish coast, with superb coast scenery, splendid bracing air, miles of broad firm sands, and good bathing.

It has a moderate rainfall, 32·6 inches (1901–1910), rainy days, 195—a whole day's rain unusual—humidity 84, sunshine 1,699 hours, snow and mist rare, mean annual maximum temperature 55·3°, mean minimum 48·6°, mean daily range 8·5°—a very remarkable record. It is windy, but warm, sheltered walks lie near, and numerous good shelters are provided.

The phthisis female death rate is only ·5 per 1,000.

Newquay is to be recommended, all the year round, for early phthisis, asthma, scrofula, neurasthenia, healthy people of all ages, and former residents in tropical countries. It is not advisable for advanced phthisis, bronchitis or rheumatic or cardiac cases.

Amusements are golf (eighteen-hole course), sea-fishing, bathing, cricket, tennis and (in winter) badminton. Delightful excursions may be made.

Hotels.—The Headland Hotel; The Hotel Victoria.

Penzance is the warmest winter health resort in England. Its mean temperature for the three winter months is 43°, while the mean of the lowest is 40°. The rainfall is 43 inches, rainy days 210, sunshine abundant. The soil dries quickly.

It is good for much the same class of cases as Falmouth, and has the same contra-indications.

Excursions can be made to Land's End, St. Michael's Mount and the Lizard. There are fine golf links at Lelant, easily reached by train.

Falmouth is built on one of the finest harbours in England, on two sides of a peninsula, facing north-east and south-west. On the south-west is most of the residential quarter. A beautiful cliff walk, three miles long, practically level and facing south, affords warmth and shelter when cold northerly

winds are blowing. The neighbouring coast is exceedingly fine; the Lizard is best visited from Falmouth.

The rainfall is 43·39 inches (1901–1910), rainy days 212, much of the rain falling at night, the soil drying rapidly, humidity 81·8, sunshine 1,743·4 hours; the monthly means of temperature are:—

January, 44·1°; February, 43·4°; March, 44·2°; April, 47·2°; May, 52·1°; June, 56·2°; July, 59·3°; August, 60·4°; September, 57·2°; October, 53·5°; November, 48·0°; December, 45·8°.

Mean daily range only 8·7°. The climate is warm, very equable, but relaxing.

It may be confidently recommended for chronic bronchitis, for which it is admirable; Sir Joseph Fayrer's testimony has already been quoted. Dry, irritable conditions of larynx and bronchi are greatly relieved. Also for old people and children; half the deaths occur at sixty-five and over. Other ailments which are found to be benefited are chronic albuminuria, heart disease, insomnia, scrofula and some chronic cases of phthisis. It cannot be recommended for cases of chronic rheumatism.

There is an eighteen-hole golf course, excellent bathing, boating, yachting and sea-fishing, a good tennis club and concerts in the summer. The available accommodation is unfortunately less than the demand for it.

Hotel.—The Falmouth Hotel.

Paignton is pleasantly situated on Torbay, bright and sunny, facing east, sheltered from south-west, west and north, with fine sands and good bathing. It is not only excellent as a summer resort, but also as a place of residence. Asthma, bronchitis, phthisis, cardiac cases and rheumatism do well. Excellent golf is to be had at Churston, two miles off.

Torquay is amongst the most celebrated, and is, perhaps, the most beautiful of English seaside health resorts. Magnificently situated within the northern curve of Torbay, facing south-west and encircled with tree-clad hills, over which it spreads in fine villas and gardens, it has abundant sunshine and, for the most part, exceptional shelter. These, with its dry soil, moderate rainfall, winter warmth and equability, render the climate one of great value. And this climate has the advantage of considerable variety, being rather sedative



TORQUAY.

[*To face p. 192.*]



along its southern shore, where palms and aloes border the cliff walks, but cooler and more bracing on the higher ground that slopes up to Babbacombe.

The soil dries remarkably quickly, the rainfall is moderate, 32·5 inches on 176 days (1901–1910)—an all day's rain being rare—and its humidity is exceptionally low, 79. Fog, frost and snow seldom visit it and for very brief periods, the mean annual sunshine is 1,798·1 hours—autumn and winter sunshine 557 hours; the mean annual maximum temperature 56·8°, the mean minimum 45·9°, mean daily range only 10·9°, whilst the monthly means—

January, 42·1°; February, 42·6°; March, 44·0°; April, 49·2°; May, 53·5°; June, 59·1°; July, 62·5°; August, 62·1°; September, 58·8°; October, 52·3°; November, 48·0°; December, 44·7°—

show that although the *winter* is about 3° warmer than in London in January, the *summer* is cooler by about 3° in July.

The town is very healthy; for the last ten years its average death rate has been 14·2 per 1,000, its zymotic death rate ·6 per 1,000. The drainage and water supply have been perfected at such cost as to demand notice.

Perhaps the most outstanding feature of the climate is the way in which it contributes to longevity, averting the degenerative changes of age, and rendering more tolerable the duration of chronic ailments. Twenty-five per cent. of all deaths occur at seventy-five and over. Arterial degeneration is delayed in its onset, and very slow in its later progress. Patients with chronic heart changes do remarkably well—in spite of the hills. Chronic kidney cases are equally favoured, and develop retrograde vascular changes slowly. The elderly chronic bronchitic nearly always finds alleviation, and secures longer periods of remission, particularly the sufferer from dry, irritable bronchitis and laryngitis. Sufferers from asthma usually obtain great relief, often complete cessation of their attacks. The equable climate and quiet life of the place seem to be of great benefit also to certain neurasthenics. Scrofula is almost unknown among the native population. Acute rheumatism and the acute primary pneumonia of adults are very rare.

Last, but not least, early cases of phthisis with no very acute

symptoms, and also late quiescent cases, do remarkably well in Torquay. It is found better to choose a situation within the bounds of "the old Borough"—on the limestone or the "Lincombe Grits"—rather than in the suburbs, and, for comfort and lessened risk of hæmoptysis, a house at a moderate elevation rather than one on the hill-tops.

A complete system of Medical Baths is shortly to be established.

Amusements include golf, tennis, sailing, sea-fishing, safe bathing, first-rate concerts (in the winter), a theatre, roller-skating, and delightful excursions in the surrounding country; in summer there are steamer excursions; Torbay is frequently visited by the Fleet.

Hotels.—Imperial Hotel; Osborne Hotel; Grand Hotel; Victoria and Albert Hotel.

Teignmouth stands on the northern shore of the estuary of the Teign, partly on level land, partly on steep hills behind it, and in two sheltered sunny valleys. It has a relatively cool summer and warm winter.

The climate suits sufferers from irritable laryngitis, bronchitis, heart disease, arterio-sclerosis, chronic albuminuria, gout, insomnia and nervous breakdown.

There are beautiful surroundings and good sea-fishing; the fine sands and pier afford excellent bathing.

Dawlish has fine sands and first-rate bathing. It lies in a sheltered and picturesque valley opening eastwards. The neighbourhood is beautiful. It may be advised for chronic bronchitis, scrofula, quiescent phthisis, nervous debility and insomnia. Rheumatic and neuralgic patients do not benefit. Anæmia is frequent in young girls.

Exmouth is beautifully situated on the eastern shore of the estuary of the Exe. Most of it stands on a hill facing south-west, with fine views along the coast and across the estuary. A level sea-wall runs for a mile and a half along the front.

The soil, generally speaking, is dry, the rainfall only 29·7 inches (1901–1910), rainy days 174, sunshine 1,794 hours, fogs rare. The climate is equable, the mean maximum temperature being 56·32°, mean minimum 45·33°, mean daily range 11·0°. The summer heat is never excessive, the hottest days being tempered by a pleasant breeze. It is very healthy,

the general death rate 12·78 per 1,000, zymotic rate ·44, and 41 per cent. of the deaths occurring at seventy and over.

Exmouth is a capital place for children, old people and persons returning from the tropics, for chronic bronchitis, asthma (higher parts of the town), chronic albuminuria, cardiac cases, anæmia, insomnia, neurasthenia and convalescence from acute disease. Scrofulous children do admirably. Early cases of phthisis benefit in summer, but are apt to have hæmorrhage in spring and autumn.

But the climate is too relaxing for vigorous adults; it does not suit advanced phthisis or cases prone to hæmoptysis; nor rheumatoid arthritis or muscular rheumatism.

There is good bathing, golf and tennis; sea-trips are available in summer, and there are charming drives.

Hotels.—The Imperial Hotel; Royal Beacon Hotel.

Budleigh Salterton is five miles east of Exmouth, in a sheltered valley running south-east. It has a dry soil, gravel over sandstone, and a rainfall of about thirty inches. It is restful, warm and equable, with abundant sun in winter, relatively cool with fresh, gentle breezes in summer.

Budleigh is excellent for old people—half the deaths occur over sixty-five—for Anglo-Indians and for children. Bronchitis, asthma, scrofula and insomnia benefit greatly. Heart cases improve, but level walks are limited.

There are first-rate golf links, beautiful walks and drives, river and sea-fishing.

Sidmouth lies in a very beautiful valley, finely timbered and sloping southward. Steep hills, over 500 feet in height, enclose it on west, north and east, making it one of the most wind-sheltered towns in England. There is an old-world charm and restfulness about it which the handsome new hotels have not disturbed.

The soil generally is dry, the rainfall only 31·41 inches (1901–1910), rainy days 193, humidity 82·6; the mean annual maximum temperature 55·7°, the mean minimum 43·9°, the monthly means—

January, 41·6°; February, 41·1°; March, 43·2°; April, 46·6°; May, 51·9°; June, 56·1°; July, 60·1°; August, 60°; September, 56·8°; October, 52·1°; November, 45·3°; December, 42·7°—mean daily range 11·8°. So there is remarkable equability.

The average annual sunshine is 1,711 hours—autumn and winter sunshine 528 hours.

The general death rate is 11·6 per 1,000 (excluding visitors), the zymotic death rate ·39. People live to a great age, and persons of over eighty, of both sexes and all classes, are generally cheery and active; one, lately, almost reached 105. Phthisis and other tuberculous diseases are remarkably uncommon.

Sidmouth may be safely advised for old people, for cases of chronic bronchitis, asthma, chronic nephritis, chronic heart disease, arterio-sclerosis, neuritis, neurasthenia and insomnia (if not wanting constant amusement), for convalescents, children and persons home from the tropics. Patients, especially children, recovering from lung troubles, do exceedingly well. In phthisis it is often useful, but early cases should probably not be sent there, except those with hæmoptysis, which should be placed in shelter and not on the sea-front. Advanced cases tend to live long, and sometimes make surprising recoveries.

Baths.—The Baths have elaborate arrangements for applying sea-water of any temperature and dilution; the best results are obtained by the Aix massage-douche, in cases of chronic joints, sciatica and muscular rheumatism. “Nauheim treatment” is carried out with sea-water.

Young, vigorous adults, however, find Sidmouth relaxing; in July and August heart and lung cases tend to flag; and it is not advisable for rheumatoid arthritis or sufferers from acute gout.

The surroundings are delightful and there are safe bathing, boating and sea-fishing.

Hotels.—The Victoria Hotel; Fortfield Hotel.

Seaton is perhaps the most bracing place on the South Devon coast, and is valuable for convalescents. It is open to south and south-east, but mostly sheltered from south-west and north-east. The rainfall is about thirty-two inches, and the soil soon dries. Half a mile of esplanade is well screened from the north. The phthisis death rate only ·7 per 1,000. There are good golf, sea-fishing and bathing. The village of Beer, beloved of artists, is beside it.

Hotels.—Beach Hotel; Royal Clarence Hotel.

Lyme Regis is a quiet little town in a valley running down



Photo by G. T. Harris, Sidmouth.

SIDMOUTH FROM PEAK HILL.

[To face p. 196.]

steeply to the sea. The climate is excellent for all ages, its mildness and equability adapting it specially for the old, and those returning from abroad. It may be well advised for bronchitis, scrofula, chronic albuminuria, insomnia and asthma. The hills are too abrupt for most heart cases.

There are good sea-fishing, boating and bathing, beautiful walks, and, for the geologist, celebrated fossil-beds to explore.

Weymouth, on the level shore of a fine crescentic bay, facing east, between the Downs and the "Isle" of Portland, is a very favourite summer resort, healthy and sunny, remarkably dry and cool in summer, with excellent bathing.

The rainfall is only twenty-seven inches, on 153 days (1901-1910), humidity only 79, sunshine abundant (1,796 hours), mean annual maximum temperature 56.1° , mean minimum 45.5° , mean daily range 10.6° .

Early phthisis (in the months from May to September), neurasthenia, insomnia, cardiac cases and chronic albuminuria, do remarkably well; but chronic rheumatism, bronchitis and asthma are unsuitable.

There are golf, sailing, sea-fishing, cricket, tennis, a good theatre, and a skating-rink.

Hotels.—Hotel Burdon; The Victoria Hotel; The Royal Hotel; The Gloucester Hotel.

Swanage shelters under the southern horn of a beautiful bay which faces due east towards The Needles. A crescent of sandy beach gives good bathing. It is bright, bracing, comparatively cool in summer, affording restful and invigorating change amidst interesting surroundings.

Phthisis and other tuberculous diseases, anæmia, debility, pneumonia, pleurisy, asthma, are all uncommon, and bronchitis is not prevalent in winter.

Geologists find a wealth of material; Corfe and Studland make pleasant excursions; the Bournemouth steamers call in summer.

SUMMARY OF INDICATIONS.

Phthisis.—Wherever, in this area, there are (1) shelter from the prevalent rainy winds, south-west, west and north-west; (2) moderate rainfall and humidity; (3) a quickly drying soil, and (4) accommodation away from the actual sea-front, cases

of phthisis, fit for sending from home, may be reasonably expected to improve. From personal experience I should choose the sanatoria at Chagford and Belstone and the localities of Torquay, Paignton, Sidmouth and Budleigh Salterton.

Bronchitis.—For chronic bronchitis, including the dry, irritable variety, the warm, moist, equable climate of South Cornwall is, in sheltered places, justly celebrated. Falmouth, for instance, is admirable. In Devonshire, Torquay and Sidmouth are also excellent; and, indeed, most cases improve anywhere in sheltered situations along the South-east Devon coast.

Asthma.—Although notoriously uncertain to locate successfully, asthma often benefits at Torquay, Paignton, the higher parts of Exmouth, at Budleigh Salterton, Lyme Regis and Newquay.

Heart disease has been sufficiently dealt with in the section on South-east Devon.

Chronic albuminuria derives benefit from the same district.

Insomnia is relieved in most of the resorts described, but, perhaps, most along the southern coast.

Neurasthenia and *Convalescence* do well at Newquay, Weston, Weymouth, Boscawen, Minehead and Swanage; also, in summer at all events, on the Moors. Some cases in which insomnia is troublesome, derive advantage from the North and South Devon coasts. *People home from the tropics* find the equable climate particularly well suited to them, and *children and old people* find almost all the resorts of value.

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I have also drawn freely on what I wrote in *A Book of the South-West* (Exeter, 1907), *The Climates of Devon and Cornwall*, and on the reports there abstracted; the authors of which I am glad, at last, to be able to thank by name.

WILLIAM GORDON, M.D., F.R.C.P.

TABLE I.
1901-1910.

| Station. | TEMPERATURE. | | | | SUNSHINE (hours). | | Mean relative humidity. per cent. | Annual rainfall. inches. | No. of rainy days. | |
|-----------------------------|---------------|---------------|---------------|---------------|--------------------------|-------------------|-----------------------------------|--------------------------|--------------------|-------------|
| | January. | | July. | | Annual mean daily range. | October to March. | | | | Whole year. |
| | Mean minimum. | Mean maximum. | Mean minimum. | Mean maximum. | | | | | | |
| Kew | 35·3 | 44·1 | 54·6 | 70·9 | 13·1 | 405 | 1504 | 80·4 | 24·10 | 176 |
| Margate | 35·6 | 44·2 | 55·2 | 69 | 10·9 | 469 | 1618 | | 23·50 | 168 |
| St. Leonards | 36·1 | 44·2 | 54·6 | 67·3 | 10·7 | 544 | 1824 | 84·2 | 26·21 | 184 |
| Worthing | 35·5 | 44·8 | 54·7 | 67·3 | 11·3 | 555 | 1837 | | 26·70 | 167 |
| Ventnor | 38·2 | 46·4 | 55·6 | 67·5 | 10·2 | 545 | 1762 | 81·1 | 29·03 | 173 |
| Bournemouth (1905-1910) * . | 35·6 | 45·2 | 53·4 | 68·8 | 13·1 | 602 | 1855 | | 30·91 † | 176 † |
| Weymouth | 37·7 | 45·8 | 55·2 | 67·8 | 10·6 | 512 | 1795 | 79 | 27·08 | 153 |
| Sidmouth | 36·8 | 46·5 | 53·4 | 66·8 | 11·8 | 528 | 1711 | 82·6 | 31·41 | 193 |
| Torquay | 39 | 48 | 55 | 68 | 10·9 | 557 | 1798 | 79 | 32·53 | 176 |
| Falmouth | 40·8 | 47·4 | 55 | 65·6 | 8·7 | 528 | 1743 | 81·8 | 43·39 | 212 |
| Sellies | 43·1 | 49·7 | 56·7 | 64·6 | 7·6 | 541 | 1752 | 84·7 | 30·70 | 206 |
| Newquay | 40·7 | 47·7 | 55·4 | 64·6 | 8·5 | 517 | 1699 | 84 | 32·60 | 195 |
| Ilfracombe | 39·5 | 46·4 | 56·1 | 65·7 | 8·4 | 411 | 1801 | | 37·46 | 193 |
| Weston-super-Mare | 36·8 | 45·6 | 56 | 69·3 | 11·6 | 470 | 1577 | 78 | 29·40 | 160 |

* The Bournemouth figures are not strictly comparable with the rest, being for six years only.

† These figures refer to 1906-1910 only.

TABLE II.
COMPARATIVE STATISTICS OF NEWQUAY AND FOREIGN HEALTH RESORTS.
I.—MEAN TEMPERATURE.

| Place. | Jan. | Feb. | March. | April. | May. | June. | July. | Aug. | Sept. | Oct. | Nov. | Dec. | Difference of hottest and coldest month. |
|--------------|------|------|--------|--------|------|-------|-------|------|-------|------|------|------|--|
| Newquay . | 43·6 | 42·9 | 45·1 | 48·9 | 52 | 57·8 | 60·6 | 61·3 | 58·8 | 53 | 48·5 | 46·3 | 18·4 |
| Nice (Obs.). | 42·4 | 43·9 | 47·5 | 53·1 | 58·8 | 66·2 | 70·3 | 69·8 | 65·8 | 57·9 | 50·4 | 44·6 | 27·9 |
| Montpellier. | 40·3 | 42·8 | 43·6 | 55 | 61·7 | 69·1 | 73 | 71·6 | 66·2 | 56·5 | 50·4 | 42·1 | 32·7 |
| Algiers. | 53·4 | 55 | 57·9 | 61·3 | 65·5 | 71·8 | 77·2 | 76·6 | 74·8 | 68·4 | 62·2 | 56·3 | 23·8 |
| Madeira . | 59·9 | 58·8 | 59·7 | 61·2 | 63·7 | 67·3 | 70·7 | 72·1 | 71·4 | 68·4 | 64·6 | 60·8 | 13·3 |

II.—MEAN DAILY RANGE OF TEMPERATURE.

| Place. | Jan. | Feb. | March. | April. | May. | June. | July. | Aug. | Sept. | Oct. | Nov. | Dec. | Difference of greatest and least range. |
|--------------|------|------|--------|--------|------|-------|-------|------|-------|------|------|------|---|
| Newquay . | 7 | 8 | 8·6 | 9·2 | 9·6 | 9·8 | 9 | 9·4 | 9·8 | 8·4 | 8·4 | 7·6 | 2·8 |
| Nice (Obs.). | 12·8 | 14·4 | 15·5 | 16·7 | 16·2 | 17·1 | 18·9 | 18·3 | 17·3 | 14·4 | 12·6 | 12·6 | 6·3 |
| Montpellier. | 17·1 | 21·2 | 22·5 | 24 | 24·6 | 26 | 26·7 | 27 | 25·9 | 21·6 | 17·7 | 18·2 | 9·9 |
| Algiers. | 12·4 | 13 | 13·3 | 13·5 | 13·7 | 14·6 | 15·1 | 13·9 | 13·5 | 13·7 | 12·6 | 11·8 | 3·4 |
| Madeira . | 11·9 | 12·6 | 12·1 | 12 | 11·7 | 11·5 | 11·3 | 11·9 | 12·1 | 12 | 12·6 | 12·4 | 1·3 |

N.B.—Nice, Montpellier and Algiers means for 10 years, 1888–1897. Madeira (Funchal), 10 years, 1881–1890. Newquay, 10 years, 1893–1902. (From *Cornwall as a Winter Resort*, by E. Kitto, Esq., F.R.Met.Soc.)

TABLE III.

| Crude figures for 1891 to 1900, (Registrar-General's last Decennial Report, 1907.) | England and Wales. | COAST OR MOOR REGISTRATION DISTRICTS WITHOUT LARGE ISLAND TOWNS. | | | | | | | |
|--|--------------------------|--|---|--------------------------------------|---|------------------------|--|--|---------------------------------|
| | | Wareham (Dorset), including Swanage. | Axminster (S.E. Devon), including Seaton. | Kings- bridge (S.W. Devon). | Okeham- ton (Dart- moor), including Chagford. | Dulverton (Exmoor). | Axbridge (Somerset), including Weston- super- Mare. | Camelford (N. Corn- wall), including Boscawen. | Falmouth (S. Corn- wall). |
| General death rate . . . | 18.19 | 12.41 | 12.43 | 13.61 | 13.11 | 11.99 | 13.89 | 13.02 | 16.34 |
| Infantile death rate . . . | 153 | 84 | 94 | 100 | 97 | 85 | 110 | 99 | 144 |
| Death rates under 5 . . . | 57.74 | 27.98 | 29.36 | 35.31 | 34.39 | 27.89 | 34.42 | 34.08 | 49.87 |
| Percentages of all deaths formed by deaths at 75 and over | 11.1 | 24.5 | 26.4 | 25.3 | 25.6 | 26.1 | 22.7 | 23.1 | 18.1 |
| Death rates from tuberculous diseases other than phthisis | .62 | .26 | .25 | .47 | .33 | .21 | .33 | .34 | .54 |

THE COAST OF WALES.

THE coast of Wales has two distinguishing peculiarities : along its whole extent it is exposed to the influence of the Gulf Stream ; and at all points it has the protection of mountainous country inland. For the ordinary purposes of topography, it is usual to describe Wales under the two headings of North Wales and South Wales. In this article, however, it will be more convenient to divide the whole coast into three sections : (1) South, extending from the estuary of the Severn to St. David's Head ; (2) West, from St. David's Head to Holyhead ; and (3) North, from Holyhead to the estuary of the Dee.

1. THE SOUTH COAST.

The south coast of Wales is very irregular and indented by alternating bays and headlands. Its general aspect is south-west ; and this brings it under the influence of two warming agencies : that of the Gulf Stream, which flows directly into the Bristol Channel, and that of the warm air coming from the equator. On the other hand, there is nothing to protect this coast from the south-west gales which at certain seasons are here felt with full force. The mean annual temperature (52°) is the highest in the kingdom, except that on the south coast of Cornwall. The mean annual rainfall (about 45 inches) is 10 inches more than that for the rest of the kingdom ; the increase being due to the proximity of the mountains. The amount of sunshine is also considerable. The foreshore is mostly sand. The diseases for which the south coast of Wales is suitable are those for which a mild marine climate is desirable. The district is well suited, particularly during the winter, for chronic diseases of the respiratory organs, especially pulmonary tuberculosis ; a malady which is, however, very common among the natives of the poorer class ; so that visitors predisposed to it should be warned to avoid places of public entertainment. With regard

to renal diseases, skin diseases, and eczema, the effects upon them of sea air are the same there as elsewhere, but are less likely to be injurious than where that air is colder or more stimulating. Cases of anæmia, and of neurasthenia of sthenic type, do well. Persons returned from India or the tropics will find upon this coast a sensible modification of the rigour of an English winter.

The most frequented health resorts along this coast are Penarth, Porthcawl, Mumbles, Tenby, St. David's and Solva.

Penarth is practically a suburb of Cardiff, and is resorted to principally by residents of that town. The sea shore is a mixture of sand and mud. Proceeding westward, the first place frequented to any extent by visitors from a distance is the small resort of **Porthcawl**, which has only 2,000 inhabitants. Here the sand is firm and the bathing good. There are comfortable hotels and lodging-houses, but many of the attractions of a larger resort are lacking.

Mumbles is a suburb of Swansea, to which it bears the relationship as a health resort that Penarth holds to Cardiff.

Tenby is the place to which probably the greatest number of visitors is attracted. It is an interesting old town, with remains of mediæval fortifications, sometimes called "Little England in Wales," from the fact that the Flemings, upon settling there, adopted the English language, and transmitted it to their descendants. The population is about 4,500. Ancient though the town is, its sea front furnishes all the requirements of a modern health resort. There is a good promenade, with terraced gardens, running down the rocky cliff to the shore. The sand is firm and provides an excellent bathing place. Lying off the front are a number of small, rocky islands, interesting to the student of marine flora and fauna. Farther out is Caldy Island; interrupting, certainly, a free view of the ocean, but serving to stem the heavy Atlantic tides, and providing an inducement for excursions. There are some good hotels, while lodging and boarding-houses abound. The average rainfall is about 45 inches, and the average winter temperature about 50°. Tenby cannot be too strongly recommended as a winter resort for tubercular patients, especially for those whose tastes for recreation lie in the direction of natural history or antiquarian research.

To the west of Tenby are Solva and St. David's.

Solva is a tiny place, situated in a creek opening into St. Bride's Bay, and distant some eight miles from Haverfordwest, from which it is reached by road. Its very primitiveness forms an attraction for some tastes.

St. David's can hardly be regarded as a suitable resort for invalids, or for any but those who delight in "roughing it." It is the most westerly place in Wales, and as such enjoys a maximum of heat and sunshine and a minimum of rainfall.

2. THE WEST COAST.

The west coast presents two large bays—Cardigan Bay to the south, and Carnarvon Bay to the north. These are separated by the Llyn, or Carnarvon Peninsula, which projects for some twenty miles. Here the sea—St. George's Channel—is warmed by *diverticula* of the Gulf Stream, which enter that channel both at its upper and lower ends. The west coast climate is therefore mild—milder than that of the south coast, owing to its partial protection by Ireland, which, though forty miles away, faces it to the west. The mean temperature on the shores of Carnarvon and Cardigan Bays is, for the summer, 58° , and, for the winter, 45° ; while the mean rainfall, which is below the average, varies between 35 and 40 inches.

The maladies for which this coast is advisable are the same as are benefited by the south coast.

The shore is sandy, but with extensive patches of pebbles in many places.

Aberystwith, situated about midway along the shore of Cardigan Bay, is deservedly the chief centre of attraction in this district, and is frequented by visitors all the year round. It is a pleasant, well-built town, bordering the crescent of a bay which is sheltered by headlands at both ends. The foreshore, though not free from pebbles, is largely made up of sand, and affords excellent bathing. There is a good promenade, a pier, and concert rooms. Abundant recreation of all sorts is provided, while inland there are many places of interest, for excursions. The population is 8,000. The temperature during the winter months ranges between 45° and 55° , and in summer about 10° higher. The mean daily range in winter and summer is 8 or 9 degrees; but in spring

and autumn it is from 10 to 12 degrees. The rainfall, *per mensem*, varies between 1·5 and 3·0 inches.

Aberdovey, as indicated by its name, lies at the mouth of the river Dovey. Many find attractions in this snug little place, nestling at the foot of rocks which shelter it from the north winds, and it is sometimes compared with Torquay. There is good bathing, and, in the adjacent river, abundant fishing, but the usual seaside resources for the visitor's amusement are lacking. The native population is barely 1,500. **Machynlleth**, a fashionable rendezvous, is in the immediate neighbourhood.

Farther north is **Barmouth**, which rivals Aberystwith in popularity. It has a population of about 2,300, and is picturesquely situated at the mouth of the river Mawddach. This resort is singular in having a remarkably narrow sea front, the rocks which shelter the town coming down close to the water's edge. Barmouth is a good centre for excursions, being the junction of the line by which Dolgelly, Bala and Llangollen are reached. Within easy reach, also, is Harlech, with its famous castle; the present custodian of which shows a disposition rather to welcome than to repel the invading English visitor. The beach at Barmouth is sandy, and good for bathing. There are numerous boarding-houses and some excellent hotels.

Pwllheli is the most northerly place upon this coast which can fairly be considered a health resort. It is situated upon the Carnarvonshire (Lleyn) promontory, and faces due south. Sheltered behind by hills which rise to a height of 200 feet, Pwllheli is well suited for a winter station. It is, however, deficient in many of the attractions expected at a seaside resort, and can scarcely be recommended to patients who like animation in their surroundings.

3. THE NORTH COAST.

On the north coast of Wales, proceeding from west to east, the places most frequented by those in search of health or recreation are Beaumaris, Llanfairfechan, Penmaenmawr, Deganwy, Llandudno, Colwyn Bay, Llandulas, Pensarn, Rhyl and Prestatyn. Having much in common, they yet present considerable local diversity. So sinuous is this coast, that different

places have widely different aspects, and there is not a point of the compass that is not faced by one or other of them. For instance, while Rhyl and Colwyn Bay look due north, Penmaenmawr and Llanfairfechan look west, Llandudno north-east, Deganwy south-west, and Beaumaris south-east. This diversity, however, does not sensibly affect the climate of these places, which would appear to be influenced more by the comparative contiguity of the mountains in their neighbourhood. Rhyl, for example, lies on level land, practically in the estuary of the river Clwyd, up the valley of which come soft south-west winds. Similarly, Llandulas and Llandudno are open on the south-west to the valleys of the rivers Dulas and Conway, respectively; while Beaumaris is fully exposed on that quarter to the winds which blow through the Menai Straits. At Colwyn Bay, Penmaenmawr and Llanfairfechan, on the other hand, mountains approach so close to the sea as to afford those places considerable protection. This proximity of the mountains not only shelters them from south-west winds, but secures them also from winds approaching them from the sea; such winds "finding the situation occupied," so to speak, by a layer of air in contact with the mountains at the back. This phenomenon has long been recognized as explaining why Great Malvern, on the eastern slope of the Malvern range, does not suffer keenly from the east wind; and the explanation has been applied by Dr. Leach, doubtless with good reason, to the similar immunity enjoyed by those places on the north Welsh coast which are closely backed by mountains. The varying contour of hill and dale on the coast also exercises an effect—and a more direct effect—upon the exposure of certain places in the vicinity to ocean-borne winds, or their protection from them. Thus, Beaumaris is protected by the high table-land of Anglesey, and Llandudno by the Great Orme's Head, from north-west winds; while other places, not so shielded, feel the force of such winds fully; especially when, as at Rhyl and Llandulas, there are valleys behind them, up which the winds can blow.

Climatically, no part of North Wales can be described as "bracing," in the sense in which that term is applied to places on the east coast. North Wales, of course, is less mild than South Wales; just as North Devon is less mild than South Devon; but for increasing a patient's "power of resistance"

there is no place in Wales than can compare favourably with any on the east coast of either England or Scotland. For patients suffering from chronic maladies, such as gout, bronchial catarrh and emphysema, or from the later stages of phthisis, or convalescent from acute illness or from injury, the coast of North Wales is undoubtedly admirably suited, especially during the winter months, when the temperature is relatively high, its daily variation small, and the amount of sunshine considerable.

As to the place to be selected for a patient, much depends upon his age and tastes. If he be young and vivacious, he will be happiest where "something is going on," as at Rhyl, Colwyn Bay or Llandudno. If he be a valetudinarian, or a man of literary bent, seeking repose, it would be well to send him to Penmaenmawr, Llanfairfechan, or other places innocent of piers and promenades. Beaumaris is a place differing in many respects from its neighbours. Steamboats call there, but there is no railway; and the usual mode of reaching it is by a carriage drive of six miles from Bangor, the nearest railway station. Thus secluded, Beaumaris has advantages which, for certain cases, are obvious.

In the matter of recreation, the district abounds in opportunities for sport and health-restoring exercises of all kinds. Bathing is excellent at all places along the coast, the sand being clean, and the water shallow. Sea fishing is, of course, procurable at any of them, and fresh-water fishing is to be had in the rivers Clwyd and Conway, and in the lakes of Bala, Capel Curig and Llanberis. Riding, shooting and golf are easily obtainable. Near by there is mountaineering to be enjoyed by those strong enough for it; while for those who "fain would climb, but that they fear to fall," a comfortable tramway is provided to the summit of Snowdon. The lover of the picturesque will be quick to confess that North Wales closely rivals Switzerland in that respect; and drives through the Sychnant and Llanberis passes will leave mental pictures of beauty not readily effaced. There is a rich harvest of interest and information to be gleaned by students of ethnology, geology, botany or philology; while the antiquarian will find himself within easy reach of half-a-dozen castles, two cathedrals and other places of historic memories.

S. D. CLIPPINGDALE, M.D., F.R.C.S.

THE NORTH-WEST COAST OF ENGLAND, FROM WALES TO SCOTLAND.

THE line of coast stretching from Wales to Scotland, and comprising the seaboard of Cheshire, Lancashire and Cumberland, presents many points of climatological and medical interest. Scattered along its shore are about a score of health resorts, all of them subject to the same general influences, but each possessing characteristics of its own.

The coast line of the Wirral, that part of Cheshire lying between the estuaries of the Dee and Mersey, faces northward and is for the most part flat. It rises, however, at the mouth of the Mersey in sandstone cliffs, on which stand New Brighton and Wallasey. There is a second ridge of high ground lying along the estuary of the Dee, but the hills stop short at West Kirby and do not reach the north-west corner of the Wirral, where Hoylake stands. From Hoylake to New Brighton the coast is flat and bordered with dunes of blown sand, which rest on glacial drift.

From the Mersey to the Ribble the coast is again flat and bordered with sandhills. The set of the sea currents in this region has caused silting up of wide sandbanks, from which, at low tides and during high winds, sand is blown for many miles inland.

The coast of the Fylde—the most important district in the north-west from a health point of view—stretches from the Ribble to Morecambe Bay. The southern part, lying on the estuary of the Ribble and facing southward, is well sheltered from the north and east by trees. Proceeding northwards from Lytham, the country becomes more open, and the coast line (until the centre of Blackpool is reached) consists of the usual belt of blown sand and sandhills overlying clay or peat. This sandy tract is covered with coarse grass. On the immediate coast line trees do not grow, but only an occasional shrub, set away from the west and the prevailing

winds. Stretching from the centre of Blackpool for a few miles northward, the eroded surface of the boulder clay faces the sea in steep cliffs; while, farther north still, the triangle of country lying between the estuary of the Wyre and the sea consists altogether of alluvial deposit.

The coast of Morecambe Bay in its southern part is flat, with many miles of sand showing at low water. On the north the hills come down to the water's edge and the scenery becomes more picturesque, especially at Grange-over-Sands, which is only seven miles south of Lake Windermere.

The coast of Cumberland is for the most part low-lying and bordered with sandhills; but from Seascale northward to Maryport, the outcrop of the St. Bees sandstone gives diversity to the sea front. The same sandstone reappears at Bowness on the Solway Firth. East of Bowness, the coast of Solway is low, with mud banks, sandy tracts, and marshes.

In common with the rest of these islands, the prevailing winds are westerly, and, as the coast line is low-lying, with the hills well set back from the shore, the rain-bearing winds pass inland before shedding their moisture. There is thus a belt of country a few miles in width which enjoys an exceptionally low rainfall. The net result of the prevailing winds, low elevation and generally exposed situation, is to give an almost purely marine climate, less cold in winter, and less warm in summer than inland places of the same latitude. The relative humidity of the atmosphere is high, but, owing to the continuous air movement which characterizes the coast, fogs are rare.

The climate, while westerly winds prevail, is bracing without being harsh. When, however, the wind blows from the east (an infrequent occurrence) the atmosphere is cold, dry, and often inclement; and nowhere is the contrast between the west and east winds more markedly felt than on this coast line.

The chief divergences from these general features are found at West Kirby, Lytham, and Grange-over-Sands, and will be noted in mentioning the resorts individually.

West Kirby, a quiet resort, situated on the estuary of the Dee, looking westward, is built chiefly on blown sand overlying clay; but part of the town stretches upwards on

the sandstone of Caldy Hill. This hill gives shelter from the east winds, and the Welsh Mountains, which lie across the estuary, rob the west and south-west winds of much of their moisture. The result is a mild and dry climate, rather enervating in summer, but in winter, spring and autumn, very delightful. The place is suitable for cases of failing compensation in cardiac disease; for phthisis, for diabetes, for nephritis; for those neuroses requiring a sedative climate, and for convalescence. Rheumatism does badly, and the occasional prevalence of high winds from the north-west is a drawback in the treatment of the more acute cases of phthisis and heart disease.

Hoylake, a small residential town during the rest of the year, becomes a health resort in summer. Though only a few miles from West Kirby, it faces the north and the open sea, and in climate affords a marked contrast. The climate is bracing and suited at all times for the treatment of scrofulous affections. Children suffering from unhealthy conditions of the nose and throat do well in summer, as do very early cases of phthisis, which have no elevation of temperature and no tendency to hæmorrhage. Hoylake is unsuited for cases of cardiac insufficiency, for rheumatism, for Bright's disease, and for any but the very earliest cases of phthisis. The place has no organized amusements, save golf.

Southport, the second largest health resort in the north-west, lies on the southern shore of the estuary of the Ribble. It is built entirely on sand. Since the sea front and promenade were built, the beach has silted up and the sea has receded. This disadvantage has been overcome to some extent by the construction of a pier, and of an artificial lake alongside the promenade.

Southport is not quite so bracing as one might expect from its situation. It is a pleasant resort in spring and autumn, but from the middle of June to the middle of September is relaxing. The sands are firm and suited for children, and there is some sea bathing, though the water is far out. In the season there are theatres, concerts and amusements of every kind.

Heart affections do better at Southport than in the more bracing climate of the Fylde or the Wirral, and early phthisis

derives much benefit, as do the catarrhal conditions of children. In the spring and autumn the climate is suitable for convalescents.

Hotels.—Prince of Wales Hotel; Kenworthy's Hydropathic Establishment.

Lytham, a pleasant spring and autumn resort, is relaxing in summer. It is situated on the northern bank of the Ribble. Built on a sandy belt with a southern aspect, it is well sheltered by trees on the north and east, and possesses a mild and humid climate.

St. Anne's-on-the-Sea lies, as regards both position and climate, midway between Lytham on the south and Blackpool on the north. It has a moderately bracing climate, but is not as stimulating as Blackpool, and in summer is exempt from the relaxing effects of Lytham. It is a quiet resort with good bathing and golf. There is a pier and promenade, with sheltered spots for invalids.

Blackpool—the largest and most popular health and pleasure resort on the north-west coast—stretches for three miles along the projecting coast of the Fylde. It faces due west. The southern part of the town (South Shore) is but little elevated from the high-water mark, and is built on sand overlying peat. The northern part lies on the boulder clay, which attains in places an elevation of 150 feet. The clay is interlaid with layers of sand and gravel—of interest to the geologist as indicating the periods of alternate elevation and subsidence of the land, and more practically important as facilitating drainage in an otherwise unfavourable soil.

From the south, the climate becomes progressively more bracing as one approaches the North Shore, where the characteristic Blackpool climate reaches its full development in that respect, as well as in being more subject to marine influences than is usual, even with resorts on the west. Though the prevailing winds are highly charged with moisture and reach the coast from a sea warmed with the Gulf Stream, they are nevertheless bracing in an exceptional degree. There is always some air movement—gentle, for the most part, but sometimes in gales. Even in the height of summer the conditions are never oppressive.

The open situation of the town, however, has the dis-

advantage of full exposure to the east winds. For this reason March is often an unsuitable month for invalids at Blackpool.

The cases which derive most benefit are those where organic disease is absent, but where there is derangement of the nervous, circulatory, or respiratory system. Cases of organic heart disease from which all trace of rheumatism has disappeared and where the deficiency in compensation is only slight, improve at Blackpool. More advanced cases will develop dyspnœa and bronchial irritation from stress and strain of the winds, which are never absent for many days together. For chronic catarrhal conditions of the nose and throat the climate is suitable at all times of the year. Chronic bronchial catarrh, in children and young persons generally, clears up in a short time, but the same condition in persons past middle life does not improve. For rheumatism, acute and chronic, and for rheumatoid arthritis the place is not suited; the humidity is too marked and the temperature too low.

In the month of August there is a great influx of holiday makers, but the crowding only affects the central parts of the town.

Hotel.—Hôtel Métropole.

Grange-over-Sands is situated on the northern shores of Morecambe Bay, at the opening of the estuary of the Winster. It is built on the irregular surface of limestone rocks which at this point come down to the water's edge, and which, behind the town, rise to the steep, wooded heights of Yewbarrow and Hampfel. Protected on all sides but the south by hills and woods, it enjoys the most sheltered position on the north-west coast. The natural scenery is beautiful, and the lower part of the town is laid out in pleasure grounds and promenades.

The sheltered position, sunny aspect and high rainfall give rise to a luxuriance of vegetation surprising to find so far north. At low tide the sea recedes for many miles, exposing wide areas of sand and transforming the place into an inland town. In hot weather the character of the sea breezes which pass over these warm and moist sands is appreciably altered. This influence, combined with the sheltered situation, renders the place somewhat enervating in the height of summer.

Grange has a well-deserved reputation for the treatment of consumption in all its stages. The climate is also suitable for bronchitis, cardiac disease and nephritis, and for the majority of cases of asthma; unfortunately, the few cases of asthma for which the climate is not suited can only be determined after trial. Senility, whether premature or normal, is delayed in these genial and salubrious surroundings.

Seascale—a quiet little watering place on the Cumberland coast—in aspect, elevation and climate resembles Blackpool, and is suitable for the same ailments. It lies out of the beaten track, is quiet, and has no organized amusements, save golf. The firm sandy beach affords good sea bathing, and the proximity of Seascale to the Lake District is an additional attraction.

New Brighton, the popular seaside suburb of Liverpool, Morecambe, on the bay of the same name, and St. Bees and Silloth in Cumberland, conform to the general type of climate prevailing on the coast, and do not require special description.

In general, it may be said that to appreciate and derive benefit from the climate of Hoylake, Blackpool, and Seascale, one must be possessed of a certain degree of strength and energy, while West Kirby, Lytham, and Grange-over-Sands are suited to the very feeblest individuals and to the most acute cases.

F. J. S. HEANEY, M.D., F.R.C.S.

THE COAST CLIMATES OF SCOTLAND.

THE climate of Scotland is governed by the geographical position of the country on the north-western fringe of Europe. Like Ireland, it is exposed—especially along its irregular western shore—to the influence of the Atlantic Ocean and of the prevailing warm, south-westerly winds, which give to the British Islands as a whole, as well as to the coast of Norway, their mild winter climate. Like the countries just mentioned, Scotland has, therefore, a typically temperate or “marine” climate, as distinguished from the “Continental” type of climate met with in countries which are removed from the influence of the sea. This dominant climatic factor mitigates the extremes both of heat and cold all round our coast; for the sea that washes our western shores has practically the same temperature all the way from the northern islands and Cape Wrath to the Isle of Wight.

In the case of Scotland, this governing marine influence is modified by the northern situation of the country and by the presence of mountains. The northern latitude gives to Scotland not only relatively cool summers and long summer days, but also certain qualities of the atmosphere, and probably of solar radiation, which obtain also in Norway and other northern countries. The quality of the northern air, which is very important from a medical point of view, is analogous to that at high altitudes in more southern countries, but without the rarefaction. The mountains not only provide many moorland health resorts at moderate elevations, and give effectual shelter to many local climates, but also form a lofty screen against the rain-bearing winds. These mountains, which, like those of England and Wales, are mainly disposed on the west side of the country, arrest the warm rain-winds from the Atlantic. Hence, on the west side of Scotland there is a region of mild and humid atmosphere and heavy rainfall, whilst beyond the mountains on the north-eastern side of the country

the rainfall is low, and the atmosphere is comparatively dry and bracing.

There is, therefore, a marked contrast between the climates of the west and of the east. The health resorts of Scotland present many varieties of climate, some of which are of considerable medical interest; but either the eastern or the western element is usually predominant. For example, in the Western Highlands, in Skye, or on the sheltered inlets of Argyll, the softness of the air and the luxuriance of the vegetation remind the visitor of Cornwall and Jersey, with their hedges of fuchsia, hydrangea and myrtle. But forty to fifty miles eastward an entirely different climatic condition prevails, and in many exposed places, such as Lossiemouth and Thurso, in Caithness, the coast is swept during a part of the year by keen winds, and arboreal vegetation is reduced almost to a minimum.

WEST COAST.

The west coast of Scotland, like that of Norway, is of a rocky and mountainous character, and intersected by many lochs or fjords. The broken coast line is further sheltered by a long chain of islands extending from the Firth of Clyde in the south to the Hebrides in the north. Among the many localities on this coast which may be truly described as health resorts, are *Gairloch* and *Loch Maree*, *Balmacarra*, *Strome Ferry* and *Loch Alsh*—all in Ross-shire; *Kyleakin* and *Broadford* in Skye, *Mallaig* on the West Highland Railway, and, farther south, many summer resorts, such as *Appin* on Loch Linnhe, *Tighnabruaich* on the Kyles of Bute, *Dunoon*, *Wemyss Bay* and *Helensburgh* on the Firth of Clyde.

The climatic features of the whole region may be inferred from the following notes on Oban and Rothesay.

Oban, on the Firth of Lorne, is surrounded by magnificent scenery, and looks westward to the hills of Mull and Morven. This is a favourite centre for excursions by land and water—to Staffa and Iona, Ben Cruachan, Ben Nevis (4,400 feet, the highest mountain in Britain), etc. Oban is exposed to the south and south-west, and sheltered by hills from easterly and northerly winds. The climate is of a typical west coast character. The warm moist winds and ocean currents cause

a comparative equability of temperature throughout the year. The mean temperature, $48\cdot2^{\circ}$, is very nearly the same as that of Bournemouth, and only two degrees lower than that of Torquay. Comparing the winter with the summer seasons, the mean temperature for the six colder months is as high as $42\cdot3^{\circ}$, that of the six warmer months being $54\cdot1^{\circ}$. The summers are, therefore, relatively cool, and the winter season about two degrees warmer than that on the east coast of Scotland. The rainfall is comparatively heavy (52 inches), but owing to the warmth of the prevailing winds, and the well-drained and sandy subsoil, the relative humidity of the air ($84\cdot8$ per cent.) is not very high, being, in fact, less than the humidity of the south coast of England. The warm and sheltered climate of Oban permits many delicate flowering shrubs—myrtles, fuchsias, rhododendrons, azaleas and others, to grow luxuriantly throughout the year. Oban and the West Highlands generally are suitable for convalescents and others requiring pure air, a sedative climate and the quiet enjoyment of beautiful scenery. The overwrought and the neurasthenic may here combine restful surroundings with pleasant distraction. The water excursions are particularly to be recommended. Oban may be visited at any season of the year. In the springtime it affords a welcome shelter from the easterly winds. As in other parts of Scotland, the autumn months, including October, are often very beautiful.

Hotel.—The Great Western Hotel.

Rothsay (on the island of Bute in the Firth of Clyde). The principal features of the climate are to be attributed to the fact that Rothsay is situated on an island which is surrounded by a warm sea, and that there are high hills to the eastward on the neighbouring mainland. The surface of the island is irregular and wooded, and there are all varieties of shelter and exposure in its many walks, whilst the higher parts are covered by heath. On the west coast of the fine bay there is a good protection from east winds. The rainfall is 45 inches, of which nearly 32 inches falls in the seven months, October to April. The soil is gravelly, upon conglomerate and schistose rocks. Equability of temperature is a prominent character of the climate of Rothsay. The mean temperature for the entire year is $47\cdot8^{\circ}$. The winters are relatively warm, and the

summers rarely very hot, as there is nearly always a cool sea breeze. The months from March till June, with September and October, are regarded as the most pleasant. August is commonly wet, but the autumn is often sunny and free from fog. An important feature of the climate is the degree of relative humidity (85 per cent.) even in the summer months, which imparts a certain sedative quality. This is favourable to many persons, but may prove enervating to others, particularly in warm weather. Children and old people generally do well in Bute; also, convalescents from acute disease. The climate seems to exert a favourable influence upon strumous children, and also upon sufferers from bronchial catarrh, especially elderly subjects. Benefit is received also in cases of renal and heart affections, when the blood pressure is not too high. On the other hand, Rothesay is contra-indicated for the following: dyspepsia and "biliousness," the early stages of phthisis, and most forms of eczema and chronic rheumatism. A variety of baths may be obtained, both at the hydropathic establishments and at the public baths. The fine steamers sailing in calm water amid great variety of scenery afford invalids the opportunity for getting sea air without fatigue.

AYRSHIRE COAST.

This is a comparatively dry portion of the west coast of Scotland, owing to the absence of mountains. The rainfall along the shore from Ardrossan to Ayr averages only 36 inches. The humidity is, therefore, lower and the climate of a more stimulating character than in the Western Highlands. The principal coast resorts are Largs, Ardrossan, Saltcoats, Troon, Ayr, Prestwick, Earn and Girvan.

EAST COAST.

The east coast of Scotland resembles that of England in its general climatic character. The summer days are longer, and the keen, dry, bracing airs of this coast are cooler, than in England, and are not to be recommended without some caution to those for whom a restful and sedative climate is indicated. This consideration does not apply with the same

force to the more northern part of the coast, for to some extent the effects of latitude counteract the easterly influences. In the neighbourhood of the Moray Firth, for example, we shall observe the operation of special influences which give to the climate of this part of the coast a character of its own. The principal seaside resorts are here arranged in order, from south to north.

Dunbar, on the main line beyond Berwick, facing the North Sea, with a pleasant and invigorating air and good golf links.

North Berwick, one of the most frequented watering places of Scotland, is situated on the east coast route to Edinburgh, on the shore of the Firth of Forth. The town has an open and northern exposure, and is an eminently bracing and sunny east coast resort, cool in summer and not too cold in winter. The sea bathing is excellent. The air is dry and the rainfall is low (about 27 inches). During the summer season it is a favourite haunt of golfers and pleasure seekers. As a climatic station it has acquired some reputation for catarrhal affections, and for the convalescence from influenza; and, like Margate, it is especially healthful for children. Patients suffering from languid neurasthenia and insomnia derive benefit, as well as invalids from home and foreign spas who may require a bracing "after-cure."

Elie is situated on the opposite or northern side of the Firth of Forth, and is a pleasant sea bathing and golfing resort.

St. Andrews (in Fife) has a typical east coast climate, dry and extremely bracing. The rainfall is 27 inches. It is the seat of an ancient university, and a favourite locality for schools. The surrounding country is interesting and historic, and there is a famous golf course. It is described by Dr. F. J. Charteris as "extremely bracing in the autumn and early winter months, and, as such, in much favour with those who, coming from the relaxing, damp west coast, require a dry, bracing climate to recuperate in after debilitating illnesses." Along this coast, as in parts of England, the east winds of spring often bring with them the "haar" or sea mist, which is so frequently found to be injurious to rheumatic and catarrhal subjects.

Stonehaven, nearly fifty miles farther north, is a summer resort with similar climatic characters.

Peterhead is situated on the most easterly point of Scotland, and about 450 miles north of London. It is surrounded by the sea on three sides. On the south the coast line is of granite cliffs, rocky and rugged; north of the town it consists of sandy beaches well adapted for sea bathing—and undulating bents where the golf course is situated. In the eighteenth century Peterhead was the most fashionable health resort in the north of Scotland. There is an excellent bathing establishment, with warm sea baths, as well as Russian, Turkish, and swimming baths.

The climate combines the influences of the east coast and of northern latitude. The air is pure, dry and very bracing. During the summer and autumn months, which are the most suitable for visitors, the prevailing winds are westerly. From May to August the days are a little cooler than in other parts of Scotland, and in the hot summer seasons Peterhead has a pleasant and grateful climate. It possesses a stimulating and invigorating quality helpful in conditions of nervous debility and exhaustion, where there is no marked organic disease; also in atonic dyspepsia, constipation and anæmia, and in such circulatory disorders as are amenable to a bracing climate. The fine air exerts a beneficial influence upon convalescents. This is also true of early phthisis and of the “scrofulous” disorders of town-bred children.

Hotel.—The North Eastern Hotel.

MORAY FIRTH.

The shores of the Moray Firth enjoy a climate all their own, to which several factors contribute. From the Moray Firth northward Scotland is abruptly narrowed, the breadth of the country diminishing by more than one half. This brings the east coast within the range of the powerful currents from the Atlantic, especially at places like Strathpeffer, where valleys stretch far inland to the west. We thus find local climates on or near the east coast profoundly modified by westerly currents—witness the mildness of the winters, the greenness of the grass, and the density and luxuriance of the foliage. The configuration of the country also accounts for the comparative shelter of the shores of the Moray Firth from easterly

influences. Again, as we have already noticed, the West Highland and Grampian Mountains afford an effective screen against rain-bearing winds from both west and south; and this region has therefore the lowest rainfall in Scotland—in some places below 25 inches. The borders of the Moray Firth, especially on the south, present, therefore, a sheltered, dry and sunny climate, well adapted for winter as well as for summer residence; although it seems strange to find pleasant winter resorts north of the Grampians.

Elgin is situated about four miles from the Moray Firth, and enjoys one of the driest and most sunny climates in Great Britain. It also has some protection from northerly winds. The average rainfall is 25 inches. The winter climate is excellent; the spring is rather trying, with north and east winds; the autumn is exceedingly good, even up to the end of November. Elgin is regarded as a good place for chronic elderly invalids, excepting in spring (Charteris).

Lossiemouth is an attractive and breezy sea-coast resort (near Elgin), with fine panoramic views of the Moray Firth.

Forres is a quiet place with a remarkably genial and well-sheltered climate. It is built on terraced slopes, in well-wooded country, with many beautiful walks and drives, and near to the famous river scenery of the Findhorn. The air is pure and dry, and the soil porous. The rainfall measures 25 inches. Owing to its sheltered position, Forres is perhaps more suitable for spring and early summer residence. The Cluny Hill Hydropathic Establishment stands amid woodland which affords miles of pleasant walks.

Hotel.—Cluny Hill House (Private Hotel).

Nairn is a valuable health resort, situated on the southern shores of the Moray Firth, fifteen miles eastward of Inverness. The town (about 5,000 inhabitants) stands upon a level sandy plain, resting upon sandstone rock. It lies open to the north and east. The northerly situation of Nairn, more than six degrees of latitude higher than London, renders the summer months cool—the mean temperature from April to September being only 52·4°. Easterly winds are somewhat prevalent in the spring and early summer. The winter months (October to March), during which westerly winds prevail, have a mean temperature of 39·7°, and are therefore

comparatively warm. The climate is dry and bracing, with much bright sunshine. The hills of Ross-shire to the west, and the Grampian range to the east and south, effectually screen this district from rainy winds, and the actual rainfall is one of the lowest in the United Kingdom (24·5 inches). The ground is porous and dry, and fog and mist are practically unknown.

Nairn, though with nearly the same aspect as Margate, is cooler in summer. It is one of the best sea-bathing places in Great Britain. There is a good covered swimming bath, and sea-weed baths are employed in affections of the glands and joints. During the latter half of the last century Nairn attracted much attention by the fine quality of its air. It has been recommended as a climatic resort, not only in the summer but in the winter months. Scrofulous children, many cases of phthisis, catarrhal affections, and also neuritis, generally do well, and it is an ideal resort for convalescents and overwrought brain workers, and as a place of "after-cure" following spa treatment. The shores of the Moray Firth, the golf course with its views of sea and mountains, and the river scenery of the Findhorn, provide inducements for an open-air life.

Hotel.—Golfview Hotel.

Fortrose and Rosemarkee.—These very quiet and restful ancient Royal Boroughs of the Black Isle are beautifully situated on its southern shore, with a south-easterly exposure, opposite Fort George and overlooking the Beaully and Moray Firths. The climate is therefore more sheltered and sunny than that of Nairn, and is one of the driest in Great Britain. (The rainfall of Cromarty is 23·1 inches.) From the peculiarity of their position and the frequent alternation of the air currents, the atmosphere combines the elements both of a marine and of a moorland climate. These resorts are helpful in asthma, catarrhal affections, and in many cases of neurasthenia and debility; also in chronic tubercular affections.

NORTH-EAST COAST.

Dornoch, still farther north, on the coast of Sutherlandshire, has acquired some reputation for invalids on account of its pure, exhilarating air, and bracing northern climate. It has

also lately become a favourite resort for golfers. The neighbouring pine-woods are believed to give a balsamic virtue to the air. The soil is dry and sandy, and the rainfall very low (24 inches). Dornoch has a sunny and southern exposure, overlooking the Firth of the same name, and the shore is well adapted for bathing. The climate is particularly to be recommended for neurasthenia and catarrhal affections, especially in the early summer months.

Hotel.—The Station.

Golspie, also in Sutherlandshire, is a small but valuable seaside resort. It faces due south, and is sheltered by woods and mountains from the north. The climate is equable and sunny; the summer days prolonged, owing to its northern latitude. The country comprises wood and open moorland. Golspie is a pleasant resort from May to December, offering to its visitors a restful and recuperative climate; but it is not to be recommended for asthma or rheumatism.

Thurso, on the north coast of Scotland, enjoys a mild and equable climate, with comparatively low rainfall (30 inches) and bright summer days.

The **Orkney** and **Shetland Islands** have a similar but moister climate, with much wind and consequent scarcity of trees and vegetation. Some cases of Graves's Disease, which are injuriously affected by the summer heat in the south, as well as subjects of hay fever, and some kinds of asthma, do well in these islands.

I desire to acknowledge my indebtedness for valuable local reports to Drs. Nairn Marshall, J. MacLachlan, Edwin Baily, Angus Matheson, Jas. Middleton, Brodie Cruikshank, Wm. Bruce and J. B. Simpson.

R. F. F.

THE SEASIDE HEALTH RESORTS OF IRELAND.

IRELAND is rich in marine health resorts.

The coast is nearly everywhere interesting, often extremely beautiful and romantic; opportunities for sea bathing are unsurpassed, and many of the golf links are of the first order. The climate, too, has many advantages. While the rainfall is heavy in the south and west, it is moderate in the north and east of the island; extremes of temperature are conspicuous by their absence; the air is always fresh and mild, and quite exempt from the harshness and rawness sometimes found on the east coast of Scotland and England, so that the days when the invalid or health-seeker cannot enjoy outdoor exercise are relatively rare. It may surprise some readers to be informed that not a few of the best examples of resorts which are bracing and tonic, without being harsh or overstimulating, are to be found on the northern and eastern shores of Ireland. Of this description are such places as Castlerock, Port Stewart, Portrush, Ballycastle, Carnlough, Larne, Donaghadee, Ardglass, Skerries, Portmarnock, Howth, Kingstown, and Greystones.

Where the opposite conditions—warmth, mildness and shelter—are desirable, Ireland possesses excellent resorts in Rostrevor, Queenstown, and Glengariff. We hear much to-day of “The Cornish Riviera,” but no part of the British Islands possesses so mild a climate as portions of the counties of Cork and Kerry: a fact conclusively demonstrated by the character of the flora. In these regions the arbutus blossoms, and the richness of plant life defies description, while the autumn colouring is of magical beauty. Bundoran and Kilkee on the western seaboard are examples of resorts belonging to the same class as Barmouth or Ilfracombe; that is to say, they are mild without being relaxing—fresh, but free from harshness. Newcastle (Co. Down), one of the most beautiful resorts in the United Kingdom, has to some extent a local climate. It lies open to the east, but, resting under the grand

massif of the Mourne Mountains, it is remarkably well protected from the prevailing winds, and hence has an exceptional mildness and stillness of climate.

Irish health resorts have suffered in popularity and in reputation in the past from the impression that they were dull, and lacking in suitable accommodation. Dull they may be in a sense. The Casino and the Kursaal are wanting. Bands of music, negro-minstrels, acrobats, jugglers, pedlars—*et hoc genus omne*—are not much in evidence, and oftener than not are wholly absent. Whether this is altogether a disadvantage may be left to the reader to judge, but it may be freely admitted that, speaking generally, the Irish resorts are not gay.

On the other hand, the accommodation has in recent years undergone a wonderful transformation. Formerly deficient in amount and indifferent in quality, it is now, in the chief resorts, ample and excellent. Hotels of the first order “with,” as Baedeker judiciously remarks, “corresponding prices,” are now found on all the coasts, and new hotels of this class are constantly springing up. The traveller who knows his way about, or the health-seeker who makes a judicious choice of locality in Ireland, need never suffer the discomforts of indifferent hotel accommodation. Golf has often been the magic wand at the touch of which has sprung up a palatial hotel on what was formerly barren rock or lonely sandhill.

Season naturally has a close connection with the attractions and suitability of the Irish marine resorts. Nearly all of them are available in summer and early autumn. In the height of summer and in hot weather the following resorts may be preferred: Portrush, Port Stewart, Castlerock, Ballycastle, Donaghadee, Skerries, Howth, Bray, Kingstown, Greystones, Rosapenna and Port Salen; although Bundoran and Kilkee have also their advocates and adherents. In spring and autumn, among the most desirable resorts are Newcastle, Warrenpoint, and Rostrevor. In winter the choice will lie largely between Glengariff (an admirable winter resort of the same class as Falmouth and Penzance), Queenstown, or Rostrevor.

The therapeutics of sea air are sufficiently discussed in other chapters of this volume, so that it is unnecessary to enumerate the conditions likely to receive benefit from a sojourn upon

the coast of Ireland. It may be desirable, however, to indicate some of the morbid states for which I believe these localities to be more or less definitely contra-indicated. The following list of such states may be suggested, but the contra-indication in some cases is by no means absolute: Rheumatism, rheumatic arthritis, gout, renal disease, nasal obstruction, pharyngitis, laryngitis with much secretion, and bronchorrhœa. Some observers, however, would not endorse the inclusion of gout and rheumatism in the list.

I shall now proceed to deal a little more in detail with some of the leading Irish marine resorts.

Portrush (Co. Antrim).—The premier place may be fairly accorded to Portrush on the north Antrim coast; one of the most picturesque, bracing and healthful resorts in the kingdom.

The town is built upon a rocky peninsula jutting out into the North Atlantic, and is surrounded by the sea on three sides. The foundation is sand or rock, and the ground dries rapidly after rain. There are magnificent sands, and the sea bathing—both deep-sea and beach—is of the first order. The water supply is good, and the sanitary arrangements satisfactory. The air is extremely bracing and tonic at all seasons of the year. There is a deficiency of local shelter. The scenery in the neighbourhood is unique; the adjacent coast, including the far-famed Giant's Causeway, being of imposing grandeur, and extremely interesting from the geological point of view. The golf links are amongst the best in Ireland. The accommodation is varied and excellent.

Resorts with conditions in general analogous to those of Portrush are Castlerock and Port Stewart (Co. Derry), Port Ballintrae and Ballycastle (Co. Antrim). Not far away, and possessing conditions somewhat less bracing than those of Portrush, may be mentioned Moville, Rosapenna, Buncrana, and Port Salon.

Bundoran (Co. Donegal) is the most considerable health resort on the north-west coast of Ireland. It has long had a considerable local reputation, and recently the creation of a good golf course and improved hotel accommodation have done much to extend its popularity over a wider area. It enjoys the full sweep of the Atlantic breezes, but there is a fair amount of local shelter. The climate is tonic, but not exciting. The

winters are very mild, but sometimes stormy. The soil is limestone and gravel. The water supply is derived from a mountain catchment area six miles distant, and is excellent.

Newcastle (Co. Down) is beautifully situated on the shores of Dundrum Bay, and lying under the lee of the great chain of the Mourne Mountains, it is well protected on several sides. The soil is sand and gravel. The water supply is abundant and of the highest quality. Sanitation is undergoing an overhaul. The golf links are amongst the premier courses in the British Islands. Good fishing can be had. The sea bathing is not of a high order, but is capable of improvement. There are numerous walks and drives of great interest and beauty. The Mourne Mountains afford admirable opportunities to the mountaineer and to the botanist. The scenery is charming, and some rare plants will reward research. The accommodation is excellent.

The following places have conditions analogous to those of Newcastle : Ardglass, Rostrevor (well sheltered on the north and east), Warrenpoint, and Greenore.

Bray (Co. Wicklow) faces the Irish Sea, but has a large amount of local shelter on the W., S., and N.N.E., owing to the proximity of the Wicklow Mountains, Bray Head, and Killiney Hill. The soil is sandy, lying on Cambrian rock. The rainfall is moderate—31·9 inches per annum. The air is comparatively dry. The water supply is derived from the River Vartry and is excellent. The sanitation is satisfactory. The accommodation is of the first order. Good golf links exist. Fishing can be obtained. Sea bathing is excellent, and there are many opportunities for hill and mountain climbing.

Conditions analogous to those of Bray are found at Skerries, Howth, Kingstown, and Greystones.

Queenstown (Co. Cork) is situated upon an island in Cork Harbour. The soil is light, gravelly, on Grauwacke with limestone in places. The town is built on the slope of a hill, and is entirely sheltered on the N., N.E., and N.W., partially sheltered on the E. and W., and quite open to the S., S.E., and S.W. The rainfall is 32·8 inches; the mean temperature 52·3° F., the mean temperature of winter and spring 47·5° F. There is a good water supply. Sanitation is satisfactory,

good fishing can be obtained, and the accommodation is adequate.

Glengarriff, already referred to in this article, has a climate similar to that of Queenstown, but even milder in character. The surrounding scenery is of rare beauty and charm.

Kilkee (Co. Clare) is built round a crescent-shaped bay, and is well protected on the W. and N.W. It is situated on a narrow tongue of land projecting into the western ocean, and is almost sea-surrounded. The soil is dry. The winters are very mild. Fishing and sea bathing are excellent. The golf links are fair, and good tennis can be had. The accommodation is on the whole satisfactory.

JAMES ALEXANDER LINDSAY, M.D., F.R.C.P.

SANATORIUMS AND SANATORIUM TREATMENT IN GREAT BRITAIN.

THE treatment of pulmonary tuberculosis has now been under discussion for many years, and general agreement has been reached that its results largely depend upon the promptitude with which the patient, at the first onset of definite symptoms, submits himself to measures for regaining his health. It has also been established, in the opinion of those best qualified to judge, that Sanatorium treatment, combined with a more or less prolonged use of tuberculin, is the best.

The relative importance of climatic conditions, and the question whether it is preferable for a sufferer from pulmonary tuberculosis to be treated abroad or in England, may be left for discussion after a brief, but necessary, review of the essential principles underlying the pathology of the disease, and some observations on Sanatorium methods.

According to our present working hypothesis we have, on the one side, the invading micro-organisms and their toxins; on the other, complex forces of the body sharing in the processes of immunization. Clearly, then, one of our principles in the treatment of the disease must be that we should raise the fighting capacity of these defensive forces. This we do by bathing the patient in fresh air, protecting him from excessive heat, moisture or exposure to wind; encouraging him to take sufficient food, with a slight preponderance of the fatty elements; and prescribing rest before meals, to ensure that the digestive capacity shall be at its best when they are taken. It is in this connection that climatic conditions have their importance; but that it is not paramount is shown by the fact that equal success has attended treatment of pulmonary tuberculosis on modern lines under most diverse climatic conditions. For example, Prof. Saugmann, whose sanatorium is only twenty-five metres above sea-level, has recently shown results at least as good and permanent as those

obtained by Dr. Turban in the Swiss Alps; although Prof. Saugmann's patients were of a poorer class, and, in consequence, treated for shorter periods. Another fact of similar import is the extraordinarily high death rate from tuberculosis among Red Indians in the Rocky Mountains, where the climate is perhaps the finest in the world. Climatic influences, however, will be discussed more fully when we have dealt with a more important feature in modern treatment—that of graduated exercise.

The invading organisms and their toxins produce effects which may be either local, or both local and general. A small dose of such toxic substances will usually increase the effort of the body towards immunity and repair; while a dose in excess of the capacity of its defensive forces for response, leads to extension of the disease. The regulation of the dose of bacterial products absorbed from the diseased area into the general circulation is, therefore, the prime essential in treatment. It is found that the quantity absorbed is governed chiefly by the amount of lymph and blood which passes through the diseased area in a given time. This, in turn, largely depends upon the movement of the lungs, and is in great part determined by the degree of exertion allowed the patient. When the dose of bacterial products is in excess of the capacity of the defensive forces, we limit movement until the amount absorbed is such that there is once more response. This dose after a time becoming ineffective, we increase it in order to maintain the requisite stimulation, and we increase proportionately and gradually the amount of exercise or movement.

While intelligent regulation of exertion is thus the most important factor in treatment, the defensive forces are assisted by appropriate climatic conditions; and change of air—always stimulating—is not less so in pulmonary tuberculosis than in other morbid states. Patients seldom do quite as well at a sanatorium in the immediate neighbourhood of their own homes as at one some distance away. Conditions which have previously proved beneficial to them, such as sea or mountain air, should be taken as a guide. Speaking generally, a sandy soil, a low rainfall, and adequate protection from the prevailing wind are the conditions

to be desired. For many cases a moderate altitude—one varying from 200 to 1,500 feet—is an advantage; but for the great majority treatment at high altitudes, as at Davos, Denver or Harrismith (Orange Free State) is not required. When, indeed, improvement is not taking place elsewhere, such conditions may be tried; but their chief use is as an after-cure. In my experience it is better that patients should endeavour to regain health under climatic conditions not very different from those to which they will be exposed in after life, and they are therefore well advised to obtain treatment at an institution in their own country. One thing more: temperate or cold climates should invariably be chosen—tropical climates, never.

In this country there are sanatoriums enough, and differing sufficiently in situation, to meet all the indications, but a few may here be mentioned, as illustrating a variety of conditions.

There is the Banchory Sanatorium, in the Dee Valley, at an altitude of 800 feet, amidst the pine country; the Mundesley Sanatorium, at sea-level, on the east coast; the Pendyffryn Hall Sanatorium, at a moderate elevation, on the coast of Wales; the Linford Sanatorium, at 160 feet, in the heart of the New Forest and fourteen miles from Bournemouth; the Home Sanatorium, at Bournemouth itself; sanatoriums on the Mendip and Cotswold Hills; the Rostrevor Sanatorium, at 350 feet, in Ireland; and the Vale of Clwyd Sanatorium, at Ruthin in North Wales.

In choosing an institution, however, the most important point to consider is not so much the nature of the surroundings as the character and capacity of the medical man in charge. It should be remembered that changes occur in the staff of these institutions, so that care should be taken to obtain recent and trustworthy information as to any particular sanatorium.

So far, I have dealt with the requirements for cases at an early stage and likely to afford examples of permanent arrest of the disease. In more advanced cases, secondary infection is not infrequently the dominant factor, and consequently climatic conditions become of greater moment. The subject, however, may be dismissed in a few words; for the climates to be chosen are, practically, those which benefit the different

varieties of bronchial catarrh—and here equability, and some times humidity, are of chief importance.

ARTHUR LATHAM, M.D., F.R.C.P.

In the United Kingdom there are many sanatoriums to which admission is either free or on payment of nominal sums.

Subjoined is a list of institutions where the charge is two guineas a week and upwards.

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| London Open-Air Sanatorium, "Pinewood," Nine-Mile Ride, Wokingham. | Eastcliffe House, Broadstairs (for children). |
| Crossley Sanatorium, Kingswood, Frodsham. | Mundesley Sanatorium, Mundesley, Norfolk. |
| Blencathra Sanatorium, Threlkeld, Penrith. | Kingwood Sanatorium, Peppard, Oxon. |
| The Ashover Sanatorium, Nr. Chesterfield. | Mendip Hills Sanatorium, Hill Grove, Wells. |
| Dartmoor Sanatorium, Nr. Chagford. | Nordrach-on-Mendip, Nr. Blagdon, Bristol. |
| Udal Torre Sanatorium, Yelverton, R.S.O. | Winsley Sanatorium, Nr. Bath. |
| Felix House Sanatorium, Middleton St. George, R.S.O. | Chilton Hill House, Sudbury, Suffolk. |
| Merivale Sanatorium, Sandon, Nr. Chelmsford. | East Anglian Sanatorium, Nayland, Suffolk. |
| Cotswold Sanatorium, Nr. Stroud. | Crooksbury Sanatorium, Farnham, Surrey. |
| Painswick Sanatorium, Painswick, Nr. Stroud. | Ockley Sanatorium, Nr. Leith Hill, Ockley. |
| West Howe, Kinson, Bournemouth. | Eversfield Hospital, St. Leonards-on-sea. |
| The Home Sanatorium, Southbourne West, Nr. Bournemouth. | King Edward VII Sanatorium, Midhurst, Sussex. |
| Linford, Nr. Ringwood, New Forest. | Rudgwick Sanatorium, Sussex. |
| Moorcote, Eversley, Hants. | Westmorland Consumptive Sanatorium, Meathop, Grange-over-Sands. |

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| The Midland Open-Air Sanatorium, Bourne Castle, Belbroughton. (Chalet System.) | Woodburn Sanatorium, Morningside, Edinburgh. |
| Ruebury Sanatorium, Osmotherly, Northallerton. | Grampian Sanatorium, Kingussie, Inverness-shire. |
| Wensleydale Sanatorium, Aysgarth, S.O., Yorks. | Nordrach-on-Dee, Banchory, Kincardineshire. |
| Nordrach-in-Wales, Pendyffryn Hall, Penmaenmawr. | Ochil Hills Sanatorium, Milnathort, Kinross-shire. |
| Vale of Clwyd Sanatorium, Ruthin. | Manor Valley Sanatorium, Nr. Peebles. |
| Argyll County Sanatorium, Benvoulin Hill, Oban. | Rostrevor Sanatorium, Down. |
| | The Queen Alexandra Sanatorium, Davos Platz. |

INTERNATIONAL ASPECTS OF BRITISH HEALTH RESORTS.

It may be affirmed with confidence that British health resorts have not yet received international recognition.

So far as I know, English medical writers have never pointed out that our spas or climatic stations offer any special advantages to foreign invalids, and the paper on this subject which I read in 1910 before the section of Balneology and Climatology of the Royal Society of Medicine, was received at the meeting and discussed afterwards in the medical press as opening up new possibilities. Nor is there evidence that physicians abroad have discovered for themselves the balneary and climatic resources possessed by Great Britain. In a recent issue of a French composite manual, while six pages are allotted to the health resorts of Spain, two are considered sufficient for the British Isles; and in the current edition of a similar German work, there are notices of only three British spas.

Yet there can be no doubt that many of our stations, both inland and seaside, offer well-defined advantages to certain groups of foreign invalids.

Although our chief health resorts have been described in detail in the preceding chapters it is necessary for me to repeat much that I have already urged, and to add some fresh considerations.

It is convenient to begin with the general proposition that when health fails in one set of surroundings, common-sense suggests an entire change; and in its application to my immediate purpose I think attention may be justly called to the fact that in many ways our island differs more from all the Continental countries than do they from each other. It follows, therefore, that in the numerous instances when change of environment is demanded, whether for its own sake or as an adjunct to treatment balneary or climatic, the health resorts of Albion merit the attention of clinicians in very many lands.

And, since our foreign *confrères*, like ourselves, sometimes fail to obtain sufficient control over patients who remain within motor distance of home or business, it may be suggested that the plan of placing a strip of water between an invalid and his cares is not less advantageous for dwellers on one side of the Channel than on the other.

MINERAL WATER STATIONS.

Passing from the general to the specific, and dealing with the limitations as well as the merits of British spas, it may be taken as certain that not many patients will be sent to them from the European mainland for an intensive bathing course alone, our cool climate not serving as an auxiliary to that form of treatment. Nor will large numbers come solely for a drinking course, since we possess no waters of types which are not represented on the Continent. Regarded purely from the climatic standpoint, however, every part of Britain has the decisive advantage of being at its best for a special purpose just when most of the Continental stations, and certainly all the spas (unless, perhaps, St. Moritz), are at their worst. That purpose is active exercise in the fresh air, and that season includes the greater portion of July with the whole of August, the most crowded months of the summer. It is true that foreign spas offer to the enfeebled superior incentives to the less severe forms of physical exertion, but a long and really brisk walk becomes a trying ordeal in the hotter months, even for persons in the best of health. The cooler climate of Britain, on the other hand, favours all kinds of outdoor exercise, including, of course, the best of all—the royal and ancient game of golf.

Taking all these considerations together, we at once perceive that the categories of foreign invalids for whom our spas are typically suitable include those who thrive in a relatively cool climate and are able to walk well; those who, in association with complete change, derive benefit from baths which are neither very hot nor taken in close succession; and, of course, those whose maladies are held to be amenable to the waters we possess.

These waters may be classified as muriated or chloride containing (including brines); muriated-sulphated; alkaline-sulphated; sulphuretted (with charge of salts both high and

low); earthy or calcareous; chalybeate; and that interesting group for which no satisfactory title has been agreed upon, and so, often called indeterminate; while, were such classification permissible, nitrogenous, radio-active, and barium containing might be added.

But, on the other hand, arsenical, and pure alkaline waters are lacking, and there is an entire absence of those classified as acidulous (or carbonic acid containing)—the last a very serious deficiency.

The remark, then, sometimes made without reflection, that we possess “all the vaunted waters of Continental spas” is seen to be without foundation.

Equally inaccurate is the statement without qualification published some years ago by a London physician, that our springs are relatively weak in mineral constituents. To cite a few instances in refutation, one of our muriated wells, the water of which is taken internally, is stronger than most of its foreign congeners, and, indeed, if the percentage of solids were but a very little higher it would be undrinkable.

Again, the strongest of our chalybeate springs contains no less than 5·4 parts of an iron salt per thousand, whereas the strongest iron spring mentioned in Dr. Huggard’s manual (Levico) contains 2·5 parts of the salt per thousand, and Monte Tesobo, the strongest Continental iron spring of which I can find a record, has 3·2 parts of mixed salts of the metal. Very much weaker are the waters of Spa (Belgium) ·07, Schwalbach ·08, and St. Moritz ·04.

We possess, moreover, for external use a brine which according to the published analyses is the most highly concentrated in Europe.

Although in our islands may be counted upwards of seventy places where there are springs containing salts commonly held to be of medicinal value, at only some dozen of these are the hydrological resources turned to systematic account and such accessory appliances installed that the term spa may properly be applied to them.

At Tunbridge Wells, formerly famous for its iron waters, owing to the growth of the town in relation to the position of the springs, medical opinion is now adverse to their use; while that town now ranks less as a health resort, in the strict

sense of the term, than as a residential resort. Hence it has not been described in this volume.

In the matter of equipment for balneotherapy, as for physiotherapy, the spas of the Continent have in the past decade made rapid strides. Advances made in one place have stimulated progress in another, so that affirmation of superiority in this respect made for any country, or indeed for a single resort, might cease to be true very soon after the pamphlet setting it forth had left the printer's hands. In England there has been scarcely less activity, and with the improvements made recently, in hand, or projected, we fairly hold our own and seem likely to continue to do so. Abroad, two schools of thought have lately been in contention. The one would have every appliance for physiotherapy added to the balneary equipment of the spas; while the other frowns upon this tendency, believing that thus the waters themselves become relegated to a position of inferiority.

In England there has been little conflict between these schools. The multiplication of accessories has not led to the waters passing into disrepute, but it is interesting to note that one of our spas has returned to its original plan of making use of the waters alone, and in the simplest possible manner.

In the matter of recreation, so necessary for invalids spending weeks, or it may be months, away from home, while at none of our spas is there quite the same movement and animation as at the gayer Continental spas (six in number at the outside), yet the livelier of our spas offer quite as much amusement of the kind which can be indulged in by the sedentary, as do any of the remaining Continental resorts; while for outdoor games and sports our country is unrivalled in the world.

Owing to the normal simplicity of English cookery, and the active habits of our population, the diet-schedules which have been drawn up at most of the spas are not very frequently made use of, and the regimen depends usually on the judgment of the individual practitioner.

Turning now to climate: uncertainty of weather—in other words, excessive rainfall—is often urged as militating against the comfort and well-being of visitors to all our resorts. An insular climate implies, of course, considerable rainfall, but

on the Continent also a great part of the spa season may not infrequently be utterly spoilt by persistent downpour.

In June, taking average years, I should be inclined to concede to the climate of central Europe a decisive superiority, for with us just at that time there is great uncertainty whether the warmth will be sufficient to render balneary treatment advantageous, at any rate to the less robust.

During July and August, Continental resorts are to be preferred to ours only by the sedentary, or, as I said before, by those whose treatment requires high temperatures as an auxiliary to intensive balneary treatment; or again, by persons who have inherited the body habit induced in a race which has lived for generations in tropical or sub-tropical countries.

Coming to September, the chances are in our favour. That month in England is often throughout dry and bracing, whereas in central Europe the weather commonly breaks during the first ten days and then becomes both rainy and chilly. For foreigners, climate in its relation to activity is the chief factor which should influence the choice between a British and a Continental spa during the summer season; or, to put it in a slightly different way, for foreigners, our spas may be regarded as climatic stations with the advantages of mineral waters, while for us they are mineral water stations with advantages of climate.

HYDROPATHIC ESTABLISHMENTS.

Whatever may be the deficiency of our spas in point of numbers, it is largely made good by the "hydros" which are to be found in all parts of our islands. These thoroughly national institutions are described in another section of this work. They constitute a resource of great value for the treatment of many British invalids; and if any of them would make a study of the special needs of foreigners they would reap a fresh harvest. At the present time any visitor from abroad who desires to enjoy a visit to one of these water-cure establishments should possess a good command of our language, and be willing to conform closely to our customs.

It is greatly to be regretted that the same term—hydro—should be applied to establishments differing so widely in

character and aim, and it is to be hoped that unless some fresh name is devised a register may be constituted of those which are adequately staffed and equipped for scientific balneary treatment.

INLAND CLIMATIC STATIONS.

Though Great Britain possesses, inland, few resorts which would be termed in France "climatic stations"—that is to say places where excellence of situation is combined with organization for the needs of invalids—those we have are of very high rank. I must ask our foreign colleagues to accept the assurance that in Britain, as well as in Ireland, it would be difficult to find an ugly district or one not typically healthy in summer, and that for air bracing yet not devoid of sedative influence, few places in the world are superior to the climatic stations already described in detail in this volume.

SANATORIA FOR CONSUMPTION.

That patients from abroad might, with advantage, be sent for treatment to our sanatoria for consumption, may at first sight appear to be a bold suggestion. Yet such is far from being the case.

Consumption is one of the diseases to which the label "English" was formerly attached abroad and accepted by ourselves also, and its prevalence was attributed to some vice inherent in our climate. It is now known that the habits of a people have more to do with the incidence of tuberculosis than any special quality of the atmosphere, and, as a matter of fact, among those who expose themselves most to the air day and night—our leisured classes—consumption is becoming so rare that before long it may be altogether stamped out.

The air of Britain, then, may at least be acquitted of blame; but just as Dr. Latham believes that the majority of British consumptives are wisely advised to obtain treatment in their own country, so I do not suggest that any very large proportion of the foreign patients should be sent here. Nevertheless, active exercise in the open air is an essential for not a few cases, and as I have shown above, our climate offers during two or perhaps three months of the year the best facilities for such

exercise; while, going a step further and speaking of outdoor *labour*, this powerful aid to recovery, here first placed on a scientific basis, is better understood in this than in any other country.

THE SEASIDE.

Turning now to the seaside (and dealing chiefly with the summer season) I am obliged again to repeat much of what I have said elsewhere.

Of the sea coast of Britain it is not too much to say that although it is impossible to point to any part which has not in summer an agreeable climate, yet climatic variety is its leading characteristic. Facing every point of the compass, some with scarcely any shelter from the wind, others well protected in land-locked bays, there are towns and villages presenting from June to September a graduated scale of invigorating climates not to be found on any other European seaboard, and surpassed only by the antipodean islands of New Zealand.

The summer climate of our south coast, from a point a little to the south of Margate on the east to Penzance on the west, may roughly be compared with that of the French coast from St.-Pol-sur-Mer to Roscoff, or perhaps Le Conquet; but local factors introduce so many modifications that there is little resemblance between the individual resorts. In winter, however, our best sheltered stations, from Bournemouth westward, owing to their southerly exposure enjoy a milder climate than those of the French coast opposite. There is no maritime climate in France closely comparable with that of the east coast of Britain, from Margate to the north of Scotland, nor with the west coast, from Weston-super-Mare to the Hebrides. On the other hand, we have none in any way resembling that of the French coast from Arcachon to Hendaye, and still less that of the Côte d'Azur; but these regions, and especially the latter, scarcely come into the count as summer stations, at any rate for northern peoples.

Regarded from almost every other standpoint, the seaside resorts of the two countries lend themselves rather to contrast than comparison. For persons seeking the brightness and particular kind of gaiety of Trouville, we have nothing to offer.

They might as well ask for the Alps at Enghien, or the Quartier Latin at Paramé. I do not know, moreover, in England, of any little nooks of a type not uncommon in France, and well represented by Pourville. Places of that size are with us usually rough fishing hamlets, and hotels in any way equal to those in France are not to be found.

Between the long and indented coast line of Britain and the shorter and less varied German littoral not many comparisons can be drawn. Still, it is useful to remember that the mean summer temperature of the southern part of our east coast is about the same as that of the North Sea island of Borkum; while that of the northern portion finds its counterpart in the island of Keitum. These localities have other features nearly in common, the daily range of temperature on our east coast being only fractionally less, and the hours of bright sunshine rather fewer, while the relative humidity is a little greater. I have not been able to procure the rainfall figures for all the stations, but between Margate and Borkum, which are sometimes compared, I have found a rather surprising difference. In summer, when these stations come into rivalry, the rainfall of Margate is much less than that of Borkum; during the three months of summer the mean rainfall for Margate being 112 mm., and for Borkum 212 mm.; while August, the driest month in the year at Margate, with 24·9, is at Borkum the wettest, with 89 mm.

Of the Baltic resorts I have come across meteorological statistics only for Swinemünde, and it is interesting to note that the figures of mean summer temperature and mean relative humidity agree closely with those of Bournemouth.

In comparison with those of Germany, our coast towns have been longer resorted to for health and pleasure, and so have the advantages of age—with its disadvantages. Some of them are much larger, and the greater preponderance of a population permanently resident lends a more sedate air. Along the sea front of the more important towns there are many miles of concreted walks, often provided with rain-shelters, and, also, carriage roads of easy gradient. It is, indeed, the stereotyped repetition of a sea-front promenade that gives the British seaside town its distinctive cachet. It constitutes a feature of psychic as well as physical import, for

not even the attraction of bands and minstrels can bring together, at the same time and in a limited area, a concourse of people sufficient to create a scene of animation such as we see in foreign health resorts. At the hotels, even when a *chef* presides, the cookery is modified to suit insular taste, and the dishes resemble in their comparative simplicity those at the *tables de régime* of Continental spas.

For foreign invalids the most suitable of our seaside stations are those of moderate size. They are described by foreign visitors who like them as dignified, well administered, and offering few forms of excitement likely to distract attention from the pursuit of health; by those to whom they do not appeal, and who of course should never have been sent there, as insufferably dull. Eschewed in England by the "fast set," they attract the more sedate of the aristocracy and the steadier members of the professional and commercial classes, and may thus well prove intolerable on the one hand, or congenial on the other, to corresponding representatives of foreign society.

Winter quarters must be discussed in less certain tone, though the choice of resorts is wide, including Hastings toward the eastern end of the south coast, Bournemouth and Ventnor (Isle of Wight) about the middle, with all the coast towns farther to the west as far as the tip of the Cornish promontory, and, again, the north coast of Cornwall and Devon, the Dorset coast and parts of the seaboard of Wales. To these may be added some favoured places in Scotland and Ireland. All these places have been described in such detail in earlier chapters that few remarks are required here.

For invalids from very warm countries they would probably be unsuitable; but, just as they offer certain advantages to Britons, so they may be selected for foreigners who live in latitudes not very different from our own.

Convalescents from an exhausting illness who are still too feeble to take much exercise, will usually make much more rapid progress in countries where there is more abundant sunshine than in Britain; but at a later period, when the powers of locomotion have been regained, our winter stations offer great advantages. Most of us, well or ill, find great enjoyment in the bright days of the Riviera and such districts, but after a succession of winters there, the power of resistance against the

cold of spring or even of early summer in more northerly latitudes becomes lessened. On the other hand, a winter sojourn in our stations (with a mean temperature about eight degrees lower) fortifies the invalid who has passed a certain turning-point.

It must also be remarked that any one coming from central Europe, where, with great heat in summer and great cold in winter, there is excessive dryness throughout the year, may derive great benefit from a more equable climate with much greater humidity. Invalids seek above all for change, but we Islanders are so much accustomed to find the change that is beneficial to us in a drier air that it is difficult for us to realize that in central Europe there is a large population whose health is impaired by the long-continued dehydration of the skin consequent on excessive dryness of the air. It is such persons who, as Frankenhäuser has shown, seek rehydration, and so rest to the overworked evaporative function of that organ, by bathing in the sea or in the muriated waters with which the spas of Germany are so liberally endowed. He has, however, failed to point out that the end in view would be better served by a stay in a moisture-laden atmosphere such as that found in the British Isles at all seasons, and especially at or near the sea coast. At the seaside, then, as inland, the case for British stations must rest chiefly on certain peculiarities of climate; and this leads me to conclude with the remark, which will bear repetition until it becomes more than a commonplace, that Continental health resorts should not be regarded as competing with British health resorts, nor British with Continental; for they are—if only for climatic differences—complementary to each other.

NEVILLE WOOD, M.D., M.R.C.P.

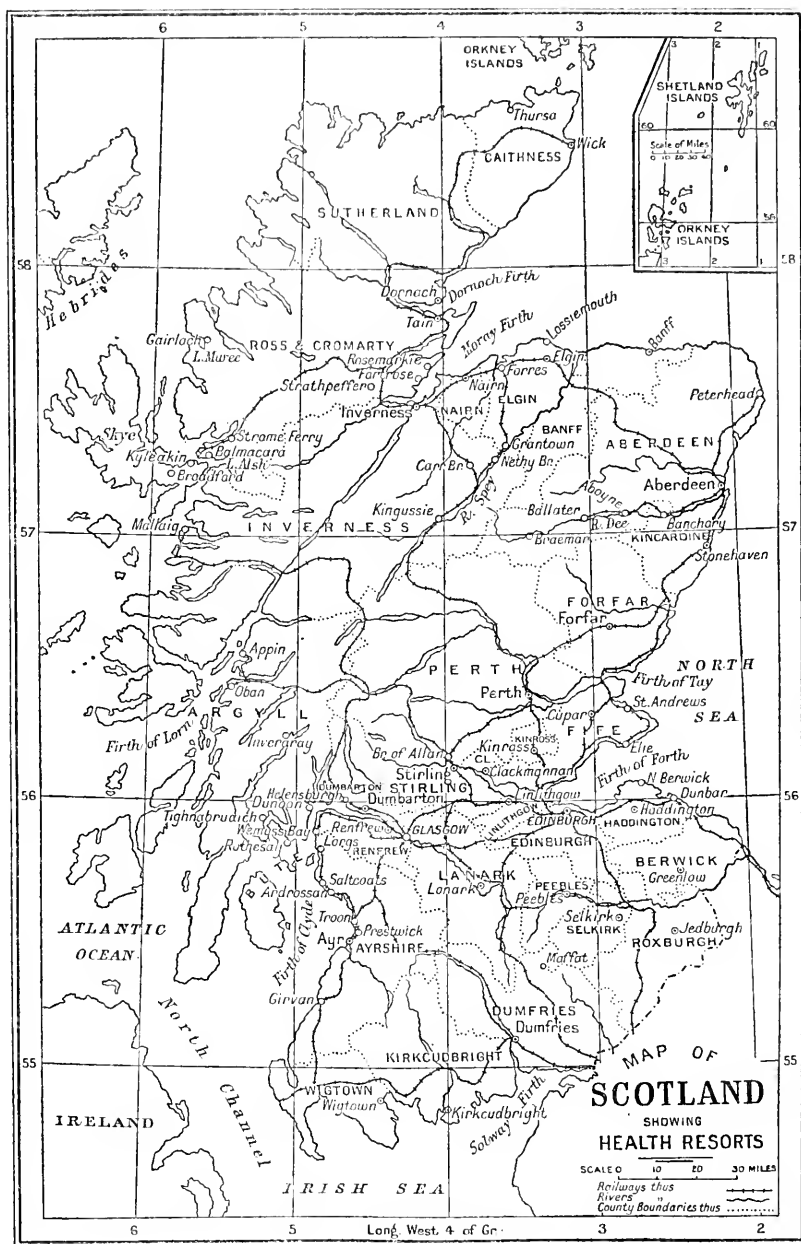
COMPARISON OF THE CENTIGRADE THERMOMETER WITH FAHRENHEIT'S AND RÉAUMUR'S, GIVING THE CORRESPONDING VALUES FOR EACH DEGREE, FROM $+50^{\circ}$ TO -41° CENTIGRADE.

From A. BUCHAN'S *Introductory Textbook of Meteorology*.

| Cent. | Fahr. | Réau. | Cent. | Fahr. | Réau. | Cent. | Fahr. | Réau. | Cent. | Fahr. | Réau. |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° |
| 50 | 122.0 | 40.0 | 27 | 80.6 | 21.6 | 4 | 39.2 | 3.2 | -19 | -2.2 | -15.2 |
| 49 | 120.2 | 39.2 | 26 | 78.8 | 20.8 | 3 | 37.4 | 2.4 | -20 | -4.0 | -16.0 |
| 48 | 118.4 | 38.4 | 25 | 77.0 | 20.0 | 2 | 35.6 | 1.6 | -21 | -5.8 | -16.8 |
| 47 | 116.6 | 37.6 | 24 | 75.2 | 19.2 | 1 | 33.8 | 0.8 | -22 | -7.6 | -17.6 |
| 46 | 114.8 | 36.8 | 23 | 73.4 | 18.4 | 0 | 32.0 | 0.0 | -23 | -9.4 | -18.4 |
| 45 | 113.0 | 36.0 | 22 | 71.6 | 17.6 | -1 | 30.2 | -0.8 | -24 | -11.2 | -19.2 |
| 44 | 111.2 | 35.2 | 21 | 69.8 | 16.8 | -2 | 28.4 | -1.6 | -25 | -13.0 | -20.0 |
| 43 | 109.4 | 34.4 | 20 | 68.0 | 16.0 | -3 | 26.6 | -2.4 | -26 | -14.8 | -20.8 |
| 42 | 107.6 | 33.6 | 19 | 66.2 | 15.2 | -4 | 24.8 | -3.2 | -27 | -16.6 | -21.6 |
| 41 | 105.8 | 32.8 | 18 | 64.4 | 14.4 | -5 | 23.0 | -4.0 | -28 | -18.4 | -22.4 |
| 40 | 104.0 | 32.0 | 17 | 62.6 | 13.6 | -6 | 21.2 | -4.8 | -29 | -20.2 | -23.2 |
| 39 | 102.2 | 31.2 | 16 | 60.8 | 12.8 | -7 | 19.4 | -5.6 | -30 | -22.0 | -24.0 |
| 38 | 100.4 | 30.4 | 15 | 59.0 | 12.0 | -8 | 17.6 | -6.4 | -31 | -23.8 | -24.8 |
| 37 | 98.6 | 29.6 | 14 | 57.2 | 11.2 | -9 | 15.8 | -7.2 | -32 | -25.6 | -25.6 |
| 36 | 96.8 | 28.8 | 13 | 55.4 | 10.4 | -10 | 14.0 | -8.0 | -33 | -27.4 | -26.4 |
| 35 | 95.0 | 28.0 | 12 | 53.6 | 9.6 | -11 | 12.2 | -8.8 | -34 | -29.2 | -27.2 |
| 34 | 93.2 | 27.2 | 11 | 51.8 | 8.8 | -12 | 10.4 | -9.6 | -35 | -31.0 | -28.0 |
| 33 | 91.4 | 26.4 | 10 | 50.0 | 8.0 | -13 | 8.6 | -10.4 | -36 | -32.8 | -28.8 |
| 32 | 89.6 | 25.6 | 9 | 48.2 | 7.2 | -14 | 6.8 | -11.2 | -37 | -34.6 | -29.6 |
| 31 | 87.8 | 24.8 | 8 | 46.4 | 6.4 | -15 | 5.0 | -12.0 | -38 | -36.4 | -30.4 |
| 30 | 86.0 | 24.0 | 7 | 44.6 | 5.6 | -16 | 3.2 | -12.8 | -39 | -38.2 | -31.2 |
| 29 | 84.2 | 23.2 | 6 | 42.8 | 4.8 | -17 | 1.4 | -13.6 | -40 | -40.0 | -32.0 |
| 28 | 82.4 | 22.4 | 5 | 41.0 | 4.0 | -18 | -0.4 | -14.4 | -41 | -41.8 | -32.8 |

Comparison of the Scales for each Tenth of a Degree.

| | | | | | | | | | | | |
|-------|---|------|------|------|------|------|------|------|------|------|------|
| Cent. | . | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 |
| Fahr. | . | 0.18 | 0.36 | 0.54 | 0.72 | 0.9 | 1.08 | 1.26 | 1.44 | 1.62 | 1.8 |
| Réau. | . | 0.08 | 0.16 | 0.24 | 0.32 | 0.4 | 0.48 | 0.56 | 0.64 | 0.72 | 0.8 |
| | | | | | | | | | | | |
| Fahr. | . | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 |
| Cent. | . | 0.06 | 0.11 | 0.17 | 0.22 | 0.28 | 0.33 | 0.39 | 0.44 | 0.5 | 0.56 |
| Réau. | . | 0.04 | 0.09 | 0.13 | 0.18 | 0.22 | 0.27 | 0.31 | 0.36 | 0.4 | 0.44 |
| | | | | | | | | | | | |
| Réau. | . | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 |
| Fahr. | . | 0.22 | 0.45 | 0.67 | 0.9 | 1.12 | 1.35 | 1.57 | 1.80 | 2.02 | 2.25 |
| Cent. | . | 0.12 | 0.25 | 0.37 | 0.5 | 0.62 | 0.75 | 0.87 | 1.00 | 1.12 | 1.25 |



SHOWING
HEALTH RESORTS

Railways thus ———
Rivers " ~~~~~
Province Boundaries thus - - - -
County " " |-----|





INDEX OF HEALTH RESORTS MENTIONED IN THE TEXT.

(The main references are distinguished by heavier type.)

- ABERDOVEY, 206**
Aberystwith, 205
 Aboyne, **23, 24**
 Aldeburgh, **141, 140**
 Alnmouth, **136**
 Appin, **216**
 Ardglass, **224, 227**
 Ardrossan, **218**
 Aviemore, **24**
 Ayr, **218**
- Ballater, **23**
 Ballycastle, **224, 225, 226**
 Balmacarra, **216**
 Balmoral, **25**
 Bamburgh, **136**
 Banchory, **23, 24, 231**
 Bangor, **208**
 Barmouth, **206, 224**
 Bath, **11, 2, 3, 4, 9, 132, 134, 232**
 Beaumaris, **208**
 Belstone, **185**
 Bexhill, **166**
 Blackpool, **212**
 Bognor, **161**
 Boscastle, **190**
 Boscombe, **179**
 Bournemouth, **178, 241, 242**
 Braemar, **22**
 Bray, **227**
 Bridestowe, **185**
 Bridge of Allan, **26, 3, 9, 124**
 Bridlington, **139, 137**
 Brighton, **160**
 Broadford, **216**
 Broadstairs, **149, 232**
 Budleigh Salterton, **195, 198**
 Buncrana, **226**
 Bundoran, **226, 224**
 Burnham-on-Crouch, **142**
 Bute, **124, 217, 218**
 Buxton, **31, 2, 3, 4, 132, 134**
- Carnlough, **224**
 Carr Bridge, **23**
 Castlerock, **224, 225, 226**
 Chagford, **185, 198**
 Cheltenham, **42, 2, 9, 94**
 Church Stretton, **44**
 Clacton, **142**
 Cleethorpes, **139**
 Clevedon, **188**
 Clifton, **3**
 Colwyn Bay, **207, 206, 208**
 Crieff, **124**
 Cromer, **144**
 Crowborough, **48**
- Dartmoor, **184, 202**
 Dawlish, **194**
 Deal, **153**
 Deeside, **22, 24, 25**
 Deganwy, **206, 207**
 Dolgelly, **206**
 Donaghadee, **224, 225**
 Dornoch, **222, 24**
 Dover, **155**
 Dovercourt, **142**
 Droitwich, **50, 7, 8, 104, 117, 133**
 Dulverton, **183**
 Dunbar, **219**
 Dunoon, **216**
- Earn, **218**
 Eastbourne, **169**
 Elgin, **221**
 Elie, **219**
 Exmoor, **182**
 Exmouth, **194, 187, 198**
- Falmouth, **191, 198**
 Felixstowe, **141**
 Filey, **139, 137**
 Folkestone, **155**
 Forres, **221, 124**

- Fort George, 222
 Fortrose, 222
 Frinton, 142

 Gairloch, 216
 Girvan, 218
 Glengarriff, 228, 224, 225
 Golspie, 223
 Gorleston, 140
 Grange-over-Sands, 213, 124, 214
 Grantown-on-Spey, 23
 Grayshott, 71
 Greenore, 227
 Greystones, 224, 225, 227

 Harrogate, 54, 2, 5, 6, 8, 9, 133
 Haslemere, 71, 70
 Hastings, 162, 242
 Haytor Rocks, 185
 Helensburgh, 216
 Hindhead, 69
 Howth, 224, 225, 227
 Hoylake, 211, 214
 Hunstanton, 142, 141

 Ilfracombe, 190

 Kilkee, 228, 224, 225
 Kingstown, 224, 225, 227
 Kingussie, 24, 233
 Kyleakin, 216

 Largs, 218
 Larne, 224
 Leamington, 72, 2, 9, 55, 133
 Lisdoonvarna, 2, 7
 Llandrindod Wells, 78, 2, 6, 8, 9, 133
 Llandudno, 206, 207, 208
 Llandulas, 206, 207
 Llanfairfechan, 206, 207, 208
 Llangammarch Wells, 85, 2, 9
 Llangollen, 206
 Llanwrtyd Wells, 89, 7
 Loch Alsh, 216
 Loch Maree, 216
 Lossiemouth, 221
 Lowestoft, 141, 140
 Lucan, 7
 Lyme Regis, 196, 198
 Lynmouth, 189
 Lynton, 189
 Lytham, 212, 214

 Mablethorpe, 139
 Machynlleth, 206

 Mallaig, 216
 Mallow, Co. Cork, 4
 Malvern, 94, 8, 10, 123, 207
 Margate, 148, 133, 150, 241
 Matlock, 98, 123
 Matlock Bath, 98, 3, 4
 Minehead, 189, 198
 Moffat, 102, 124
 Moray Firth, 220
 Morecambe, 214
 Moretonhampstead, 185
 Moville, 226
 Mumbles, 204
 Mundesley, 141, 140, 231

 Nairn, 221
 Nantwich, 104, 8
 Nethy Bridge, 23
 New Brighton, 214
 Newcastle, Co. Down, 227, 224
 Newquay, 191, 198
 Norfolk Broads, 141
 Northam, 190
 North Berwick, 219

 Oban, 216, 233
 Okehampton, 185, 220
 Orkney Islands, the, 223

 Paignton, 192, 198
 Penarth, 204
 Penmaenmawr, 206
 Penrith, 232
 Pensarn, 206
 Penzance, 191
 Peterhead, 220
 Port Ballintrae, 226
 Porthcawl, 204
 Portmarnock, 224
 Portrush, 226, 224
 Port Salon, 225, 226
 Port Stewart, 224, 225, 226
 Prestatyn, 206
 Prestwick, 218
 Princetown, 184
 Pwllheli, 206

 Queenstown, Co. Cork, 227, 224

 Ramsgate, 151, 150
 Redcar, 137
 Rhyl, 206
 Roker, 136
 Rosapenna, 225, 226
 Rosemarke, 222
 Rostrevor, 224, 225, 227, 231

- Rothesay, **217**, 124
 Ruthin, **231**

 St. Andrews, **219**
 St. Anne's-on-the-Sea, **212**
 St. Bees, **214**
 St. Davids, **205**
 St. Ives, **181**
 St. Leonards, **162**, 155, 160, 200, 232
 St. Margaret's Bay, **154**
 Saltburn-by-the-Sea, **138**, 8
 Saltcoats, **218**
 Sandgate, **160**, 159
 Sandwich, **153**
 Scarborough, **138**, 134, 137, 139
 Scilly Islands, **183**
 Seaford, **160**
 Seascale, **214**
 Seaton, **196**, 186, 202
 Seaton Carew, **137**
 Sheringham, **141**, 140
 Shetland Islands, the, **223**
 Sidmouth, **195**, 186, 198, 200
 Sillioth, **214**
 Skegness, **139**, 140
 Skerries, **224**, 225, 227
 Skye, **216**
 Solva, **205**, 204
 Southend, **142**
 Southport, **211**, 134
 Southsea, **161**, 159
 South Shields, **136**
 Speyside, **22**, 23, 24
 Stafford, **8**
 Stonehaven, **219**

 Strathpeffer, **106**, 3, 6, 7, 9, 133
 Strome Ferry, **216**
 Sutton-on-Sea, **139**
 Swanage, **197**, 198
 Swansea, **204**

 Teignmouth, **194**
 Tenby, **204**
 Thanet, Isle of, **147**
 Thurso, **223**
 Tignabruaich, **216**
 Tintagel, **190**
 Torquay, **192**, 198
 Trefriw, **111**, 10
 Troon, **218**
 Tunbridge Wells, **9**, 236
 Tynemouth, **136**

 Ventnor, **172**, 48, 200, 242

 Wallasey, **209**
 Walmer, **153**
 Walton-on-the-Naze, **142**
 Warrenpoint, **225**, 227
 Wemyss Bay, **123**, 216
 Westgate-on-Sea, **148**
 West Kirby, **210**, 214
 Weston-super-Mare, **188**, 198
 Westward Ho ! **190**
 Weymouth, **197**, 198
 Whitby, **138**
 Woodhall Spa, **115**, 3, 8, 133, 134
 Worthing, **161**

 Yarmouth, **141**, 135, 140

INDEX OF MALADIES REFERRED TO BY NAME.

- ACNE, 22, 91, 109, 118
 Albuminuria, 46, 60, 179, 187, 189, 192, 195, 198
 Alcoholism, 129
 Anæmia, 18, 22, 37, 46, 66, 82, 101, 109, 113, 128, 160, 183, 195, 204, 220
 Angina pectoris, 87
 Arterial degeneration, 14, 22, 193
 Arterio-sclerosis, 35, 75, 82, 91, 96, 129, 196
 Arthritis, 18, 19, 20, 36, 65, 75, 82
 Asthma, 23, 70, 96, 150, 155, 161, 176, 191, 196, 198
 Bromidrosis, 52
 Bronchial catarrh, 46, 75, 158, 161, 208, 218
 Bronchitis, 14, 96, 150, 168, 175, 183, 187, 193, 195, 196, 198
 Cancer, 113
 Cardiac affections, *see* Heart.
 Cholecystitis, 65
 Cholelithiasis, 65, 75, 91
 Chorea, 53
 Colitis, 37, 64, 66, 75, 92, 101, 109, 113, 118
 Constipation, 6, 29, 64, 66, 75, 220
 Consumption, *see* Phthisis.
 Delirium, 128
 Diabetes, 22, 74, 151, 211
 Diarrhœa, 60, 158
 Digestive disorders, 7, 82, 113
 Dysentery, 60, 66, 158
 Dyspepsia, 5, 6, 9, 46, 109, 158, 220
 Eczema, 7, 29, 37, 52, 75, 91, 103, 109, 118
 Emphysema, 14, 96, 118, 208
 Fibroma, 8, 118
 Fibrositis, 7, 52, 65, 75
 Furunculosis, 191
 Gastric catarrh, 17, 46, 75, 179
 Gastric disorders, 17, 46, 75, 92, 100, 113
 Glands, enlarged, 46, 143, 146
 Glycosuria, 18, 60, 65, 74, 82
 Goitre, 118
 Gonorrhœal arthritis, 53
 Gout, 5, 7, 12, 14, 17, 18, 19, 29, 35, 36, 65, 74, 82, 91, 105, 130, 208
 Gouty ailments, 4, 7, 20, 22, 53, 103, 108, 109, 113
 Graves's disease, 52, 101, 113, 158, 175
 Hæmophilia, 29
 Headache, 129
 Heart affections, 20, 23, 29, 37, 45, 75, 87, 101, 109, 118, 150, 155, 192, 196, 198, 211, 213, 218
 Hyperidrosis, 52
 Insomnia, 128, 129, 158, 168, 179, 196, 198, 219
 Intestinal torpor, 129
 Intestinal toxæmia, 66
 Kidney diseases, 35, 45, 101, 158, 175, 196, 218. *See also* Renal disease.
 Laryngitis, 20, 109, 156, 193
 Lead poisoning, 20, 66, 113
 Lichen, 118
 Lithæmia, 74
 Liver cirrhosis, 65
 Liver disorders, 37, 65, 101, 109
 Locomotor ataxy, 37
 Lumbago, 7, 75, 109
 Lymphatic stasis, 118
 Malaria, 37, 46, 113
 Mania, 128
 Melancholia, 128
 Metallic poisoning, 109, 113
 Myalgia, 36
 Myositis, 7, 75

- Nasal catarrh, 213
 Nervous diseases, 37, 49, 100, 109, 113, 150, 168
 Neuralgia, 37, 75, 118, 165
 Neurasthenia, 4, 6, 22, 29, 36, 37, 45, 66, 70, 75, 82, 91, 113, 128, 165, 168, 175, 179, 189, 195, 196, 198, 204, 219
 Neuritis, 14, 20, 22, 37, 52, 65, 70, 75, 91, 105, 113, 118, 222, 223
 Obesity, 45, 65, 74
 Osteo-arthritis, 12, 18, 52, 109, 118
 Ovarian neuralgia, 129
 Pelvic disorders, 29, 53, 75, 101, 118, 129
 Pharyngitis, 8, 20, 109, 118
 Phlebitis, 118
 Phthisis, 24, 46, 75, 114, 146, 158, 165, 176, 179, 191, 192, 193, 195, 196, 197, 208, 211, 214, 220, 222, 239
 Psoriasis, 7, 37, 45, 71, 91, 109, 118
 Renal calculus, 18, 91, 96
 Renal disease, 91, 96, 118, 161, 204, 211
 Respiratory disease, 20, 23, 38, 48, 109, 143, 190, 196, 203
 Rheumatism, 7, 8, 18, 29, 36, 37, 52, 65, 82, 87, 91, 96, 100, 105, 108, 109, 118, 129, 130, 143, 158, 161, 165, 196
 Rheumatoid arthritis, 37, 53, 65, 87, 91, 100, 105, 109, 113, 150, 158
 Rhinitis, 8, 20, 109, 118
 Rickets, 113, 118
 Sciatica, 7, 20, 37, 39, 52, 65, 103, 109, 118, 196
 Scrofulous affections, 5, 8, 46, 92, 118, 183, 193, 220
 Seborrhœa, 7, 91
 Septic arthritis, 53
 Skin affections, 5, 7, 20, 29, 37, 46, 52, 61, 65, 71, 75, 82, 91, 103, 109, 118, 165, 204
 Sleeplessness, *see* Insomnia.
 Thermal debility, 1
 Tropical diseases, 37, 66, 158, 168
 Tuberculosis, 20, 70, 96, 114, 118, 148, 149, 150, 158, 168, 175, 176, 179, 203, 229, 239
 Urticaria, 71, 118

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